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ABSTRACT

The report deals with the design, development, and evaluation of a set of self-instructional modules concerning preinstructional competencies for teachers of the handicapped. An introductory chapter covers background information, general objectives of the program, components of the modules, and stages in the development of the modules (analysis, design, and evaluation). Summarized in Chapter II are the salient points of each of the 11 modules which involve competencies in the following areas: specifying behavioral objectives, task analysis, lesson planning through task analysis, concept analysis, planning a concept lesson, instructional games for handicapped children, choosing a curriculum package, teacher-made reading materials, classroom charts for handicapped children, classroom graphics for handicapped children, and preparing tutorial materials. Chapter III describes the activities carried out in the design and production of the actual audio-visual modules. A fourth chapter outlines the rationale and procedures involved in the evaluation of the set of preinstructional competencies modules as a total package. A final chapter discusses field-test results in three areas: trainees' attainment of preinstructional competencies as measured by applied performance tests based on the objectives for each module; changes in trainees' attitudes toward the content of the individual modules, and changes in trainees' attitudes toward the self-instructional format of the modules. (SBH)

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EVALUATION OF THE TIPS FOR TEACHERS SERIES: ELEVEN MODULES FOR TRAINING TEACHERS OF THE HANDICAPPED IN PREINSTRUCTIONAL COMPETENCIES

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PREFACE

This report deals with the design, development and evaluation of a set of self-instructional modules concerning preinstructional competencies for teachers of the handicapped. The project involved a total of 11 modules dealing with task and concept analyses, preparing a lesson plan, and designing instructional games, individualized reading materials, graphics, charts and tutoring materials. Most of the modules in the project utilized a combination of filmstrips, audiotape cassettes, and response booklets.

Analysis

A systematic procedure was used for the analysis, design, formative evaluation and revision of each module. A basic needs analysis identified the instructional topic for the modules. Learner analysis identified the relevant characteristics of teacher trainees who are likely to benefit from the use of the modules. A context analysis identified the resources and constraints in the situation in which the modules are likely to be used. Task and concept analyses yielded the components of the instructional content. Specifications for the modules were drawn up on the basis of these analyses.

Development

The actual design of the module began with the preparation of the response booklet which contained criterion items based on the instructional objectives. A script for the audiotape and a storyboard for the visuals were next created. The prototype materials were evaluated and edited by a panel of experts and suitably modified on the basis of their feedback. Each module was then tried out on representative students and suitable modifications were made on the basis of their responses, remarks and reactions.

Evaluation

A summative field evaluation involved a total package testing in two field sites under regular classroom conditions. Trainees' competencies in specific preinstructional skills were measured through the use of applied performance tests which required a transfer of the competencies to real preinstructional tasks. Attitudes of the trainees toward individual competencies and toward self-instruction were also measured. Trainees' performances on the applied tests were evaluated at the two field sites by the local instructors. When instructor ratings were compared, a discrepancy was found between the performance of the trainees in these two field sites. Possible explanations for this discrepancy included differences between the two instructors and between the two groups of learners. There was a strong indication that the materials were not as independent of the instructor as earlier formative evaluation had suggested. Results from the attitude measurement were more consistent between the two sites and were generally positive. Modules dealing with the production of a specific instructional material (e.g., tutoring materials) were generally perceived to be more interesting and useful than those dealing with the underlying theory (e.g., concept analysis). Trainee attitudes toward self-instruction showed a general positive shift as measured by a semantic differential scale. Thus, the project has resulted in the production and validation of a set of modules involving those competencies which enable teachers of the handicapped to plan and prepare materials for individualizing instruction.

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CHAPTER 1

INTRODUCTION

Teachers of the handicapped--whether in special education or regular elementary classrooms--have considerable training and experience in interactive instruction. They are ready to explain, demonstrate, question, prompt, probe, and provide feedback to a group of learners in a face-to-face situation. In contrast, they generally lack the preinstructional competencies of analyzing, prescribing, retrieving, and designing instructional materials, and the ability to integrate them into a lesson plan which focuses on the management of learning instead of teaching.

BACKGROUND

Most teachers receive instruction on stating behavioral objectives and lesson planning. They are also required to undertake these activities in practicum situations. However, many teachers of the handicapped perceive them to be "busywork" and of limited use in the classroom. This attitude is often due to a misunderstanding of the relationship between different preinstructional activities and the actual interactive teaching of the lesson. A strong and systematically planned foundation for instruction can insure more individualized learning, thus increasing learning efficiency. There is an urgent need to provide teachers with an integrated set of preinstructional competencies with sufficient face validity.

Writing behavioral objectives acquires a new meaning and importance when preceded by a task analysis and succeeded by the selection or design of suitable instructional materials. Useful and practical skills in the areas of task and concept analyses, followed by lessons planned on their basis are currently available. But, there is a problem in providing them to teachers of the handicapped in a flexible format. Until recently, the only way teachers of handicapped learners could acquire these preinstructional competencies was by enrolling in traditional lecture and textbook courses. The effectiveness of this time-honored approach has still to be proven.

The field of special education leads other areas in the development of curriculum packages (e.g., Pfau, 1972; Goodstein, 1974). These materials have very often been prepared through foundation and federal grants, reflecting the best in systematic development, attractive and functional packaging, flexible and integrated usability, and innovative content. Although widely disseminated, they have not been as widely adopted. The integration of these instructional packages into classroom instruction requires a new role for the teacher, and a new set of competencies. Under the current system, these roles and competencies are acquired only after a teacher chooses to use a curriculum package (or is told to use it by the administration). Teacher's manuals of workshops provided by package developers train the teacher in the use of that particular package. An obvious need in this area is a general introduction to curriculum packages. In addition to providing a set of preinstructional competencies to the teacher, such an introduction can clarify various doubts and misconceptions that he/she may have. Thus, both the rate of adoption and effective use of these packages can be increased.

However extensive such curriculum packages may be, there still exist many gaps in the curriculum for which there are no prepackaged materials. In these areas, the teacher is tempted to lecture and "teach" in the interactive sense of the term, even though it may not be appropriate. Some teachers do have production capabilities, but very few have instructional development skills. This is unfortunate since many of the few existing teacher-made instructional units have produced encouraging results. The teacher probably knows more about the requirements of the children in his/her classroom than even a professional team of instructional developers. The teacher can retain control over the content when he/she designs instructional packages in such forms as simple games or classroom charts. Interactive instruction is transient; a teacher faces critical problems when confronted with the below-average child who requires remedial instruction, or the above-average student who requires some "enrichment" to keep him usefully occupied, or the absentee who has to catch up with his peers. Rather than spend time in tutoring each of these types of children, the classroom which has a library of flexible instructional units that can be used efficiently provides increased systematic individualized instruction to each of these "special" children. But these units first have to be designed, and there remains very little systematic training available for the classrroom teacher at the present time.

In summary, the problems and needs of this project resulted from excess emphasis--often implicit and unnoticed--on interactive teaching. While the teacher does receive some training in becoming a planner and manager of instruction, this is usually done in a piecemeal fashion. Both preservice and inservice teachers need a systematic approach to the pre-instructional competencies of 1) analyzing instructional tasks or concepts, 2) deriving a set of objectives for the individual child, 3) systematic lesson planning, 4) selecting and planning the use of curriculum packages, and 5) utilizing analytic and planning skills to design materials which meet the objectives set for every one of their handicapped learners.

General Objectives for the Program

The mediated program was designed to deal with the improvement of preinstructional competencies of teachers of the handicapped both in special education and regular elementary classrooms. Upon completion of the following set of modules, teachers should be able to demonstrate these competencies:

Specify behavior objectives. State a comprehensive set of behavioral objectives for a lesson of his/her own choice.

Perform a concept analysis. Select a fundamental concept in the lesson taught, identify the critical and variable attributes of the concept, and collect or create a set of suitable examples and nonexamples for teaching and testing.

Perform a task analysis. Analyze a self-selected lesson topic into a hierarchical set of necessary and sufficient subtasks.

Plan a lesson using task analysis. Prepare a lesson plan based on the analysis of a main task.

Plan a lesson using concept analysis. Prepare a lesson for teaching a concept of his/her own choice. The lesson plan should include the sequence of steps, entry tests and posttests, the nature of examples to be used in different stages of teaching and testing, and specification of learner responses.

Choose a curriculum package. Identify the seven critical attributes of all good packages, state their advantages and disadvantages, and apply principles of selection in choosing a curriculum package.

Design instructional games for handicapped learners. Modify instructional games for use with handicapped children in his/her classroom and adapt existing games for the handicapped to present new topics.

Prepare teacher-made reading materials for his/her handicapped learners. Plan and write materials matched to the reading achievement level and interests of handicapped children.

Prepare classroom charts for handicapped children. Develop a classroom chart of his/her own, taking into consideration the nature of the learners, the content to be taught, the medium to be used, the timing of the presentation, and the chart's intended purpose.

Produce classroom graphics for handicapped children. Design his/her own visual materials to facilitate a handicapped learner's attainment of (a) prespecified instructional objective(s).

Design tutoring materials. Prepare, try out, and revise a specific type of tutoring kit which includes a set of flashcards for the learner and a performance aid for the tutor.

Components of the modules

With the exception of two modules, Specifying Behavioral Objectives and Choose a Curriculum Package, all the modules in the series are made up of three components: a response book, an audiocassette, and a filmstrip. All three components are integrated in a single instructional package.

The audiocassette serves as the coordinating element for the module. This audiotape is also the major source of instruction and information. Through realistic storylines, dialogues, and narration, the audiotape heightens the trainee's interest and motivation. Instruction on how to use the other components is also provided by this audiocassette tape.

The filmstrip is carefully coordinated with the audiotape through electronic synchronization (although audible advance tones are also provided on the tape for those without automatic synchronization capabilities). The visuals permit the use of such graphic devices as live photographs, illustrations, captions, charts, and proshots to supplement, clarify, enrich, and focus attention on the message presented through the audiotape.

The response book is the most important component for the trainee, as it may be retained permanently after completing the module. This book requires the trainee to complete various exercises while progressing through the module. Such active involvement on the part of the learner is expected to provide a blueprint for classroom application of whatever skills are acquired. The response book also contains the objectives for the module, flowcharts, checklists, tables, references, and other materials which the trainee may need to refer to long after working through the module.

A number of technical standards were established for the instructional design and production of the mediated series. The need for these standards will become obvious when the results of the context analysis for the use of the modules is revealed. The technical standards that were established included:

1. Each module had to be tested on representative members of the target population under replicable conditions and its effectiveness had to be clearly demonstrated.

2. Each module had to be sufficiently transportable to permit effective use by trainees without the direct support of an instructor.

3. Each module had to be integratable with all other modules in order to permit use as a total program.

4. Each module had to be competency-based and include specific behavioral objectives and criterion-referenced test items.

5. Each module had to meet technical standards for acceptable media production quality.

6. Each module had to possess sufficient face validity to satisfy expert reviewers regarding its appropriateness, effectiveness, and feasibility for teachers of the handicapped.

A MODULE FOR THE DEVELOPMENT OF THE MODULES

Selection of the particular media combination described earlier for the modules in this series was not without a strong rationale. Stolovitch (1975), in a careful review of media and media selection strategies, found that media attributes cluster into four major categories in the design of instructional materials: learner, task, production, and distribution. By comparing a wide variety of media he derived an optimal combination for obtaining the maximum number of media attributes for the least cost. As Table 1 shows, the combination of print, audiotape, and slides or filmstrip contains all the attributes of all the other media except for three-dimensionality and motion. Hence, where instruction does not require either physical manipulation or motion, this media combination is the most cost effective. The series of modules met the necessary conditions for utilizing this media combination. Production of a response book, audiocassette, and filmstrip for each module required skills which were readily available to the project team and offered the flexible, self-contained training format that was sought.

4-D model

Thiagarajan, Semmel & Semmel (1974) have evolved a systematic instructional development model, the 4-D model, which offers general guidelines for producing training materials for teachers of the handicapped. This tested model, however, has proved to be too

Table 1

Media/Media Attributes

Media Attributes		CAI input/output terminal	Videotape	Super 8- filmloop	16mm film	Overhead transparency	Slide	Filmstrip	Realia	Print	Audio tape (cassette)	Audio tape (reel)
TASK	Audio	/	X		X						X	X
	Visual	X	X	X	X	X	X	X	X	X		
	Motion	/	X	X	X							
	Color		/	X	X	/	X	X	X	/		
	3-Dimensionality								X			
	Realism		X	X	X		/	/	/		/	/
LEARNER	Response Acceptance	X				/				X	/	/
	Feedback	X	/	/	/	/	/	/		X	X	X
	Audio	/			X						X	X
	Visual	X	X	X	X	X	X	X	X	X		
	Self-Pacing	X	X	/		/	X	X	X	X	/	/
	Random Access	X	/			X	X	X	X	X		
PRODUCTION	Editability	X	/	/	/	X	X	X	/	X	X	X
	Transportability	/	/	/	/	X	X	X	/	X	X	X
	Simplicity		/			/	X	/		X	X	X
	Low Cost					X	X	/	/	X	X	X
	Short Time Requirement	/				X	X	/		/	X	X
DISTRIBUTION	Editability	X					X			X		/
	Self-Contained	X		X	X	X	X	X	/	X	X	X
	Scheduling Flexibility		X	X	X	X	X	X	X	X	X	X
	General Availability		/		/	X	X	X		X	X	X
	Ease of Use	X		X		X	/	X	X	X	X	/
	Low Cost					/	X	X		X	X	X
	Quick Set-up Time	/		X		X	/	X	X	X	X	X
	No Special Environment	/	X	/		X		/	X	X	X	X
	Grouping Flexibility	/	/	/	/	/	X	X	X	X	X	X
	Compactness Handling/ Storage		/	X	/	/	/	X		/	X	/

X = Is usually present in the medium
/ = Can be obtained, but is not a usual attribute of the medium
= Is usually not associated with the medium

general when applied to the development of modules in which there is a prespecified media combination. Stolovitch (1975) has made a number of adaptations to the model and has tested two products with student teachers. The success of this adapted model permitted it to become the primary source document for the development of all the modules in the pre instructional series. This adapted model, shown in Figure 1.1, is described below.

Analysis Stage

This stage is concerned with identifying the different factors which influence the design and development of the instructional modules. During this stage, a systematic needs analysis is carried out to find the most appropriate topic for each module. Based on this topic, learner, context, task and concept analyses are conducted to derive a set of instructional requirements consistent with the needs, environmental factors, and learner characteristics, and a set of behavioral objectives based on the structure of the tasks and concepts.

Needs analysis. The production of an audio-visual training module should be preceded by a systematic analysis so that real problems are identified and arranged in an order of priority. During this step, symptoms of the problem are identified to clarify in specific terms its characteristics and effects. As the problem is diagnosed, underlying causes are uncovered, yielding alternative solutions.

Learner analysis. This analysis examines the target audience. Audio-visual training modules which are produced by a developer without careful consideration of the learner's characteristics are usually ineffective (Gordon, 1970). Content, presentation form, language

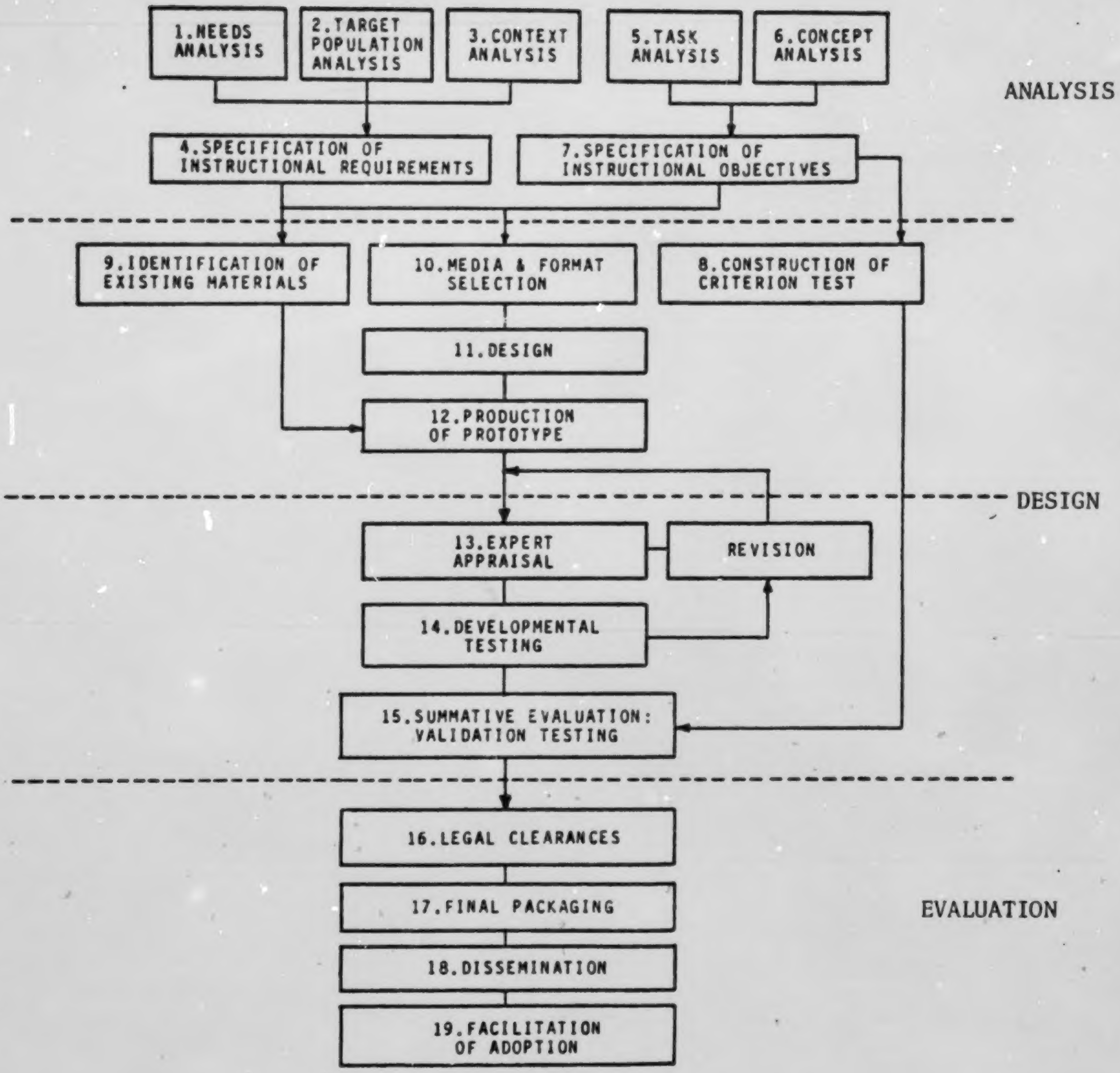

1. NEEDS ANALYSIS
2. TARGET POPULATION ANALYSIS
3. CONTEXT ANALYSIS
5. TASK ANALYSIS
6. CONCEPT ANALYSIS
ANALYSIS
4. SPECIFICATION OF INSTRUCTIONAL REQUIREMENTS
7. SPECIFICATION OF INSTRUCTIONAL OBJECTIVES
9. IDENTIFICATION OF EXISTING MATERIALS
10. MEDIA & FORMAT SELECTION
8. CONSTRUCTION OF CRITERION TEST
11. DESIGN
12. PRODUCTION OF PROTOTYPE
DESIGN
13. EXPERT APPRAISAL
REVISION
14. DEVELOPMENTAL TESTING
15. SUMMATIVE EVALUATION: VALIDATION TESTING
16. LEGAL CLEARANCES
17. FINAL PACKAGING
EVALUATION
18. DISSEMINATION
19. FACILITATION OF ADOPTION

Fig.1 Adapted 4-D Model (Stolovitch, 1975)

level, and approach must all vary with the type of learner utilizing the module. Learner analysis permits identification of those learner characteristics which are likely to interact with the design of instruction. In this step, the developer constructs questionnaires to test the learner's entry level knowledge, skills and experience. Suitable scales are also administered to test the learner's attitudes toward the content and the audio-visual format. A survey to determine language, style and media preferences is also undertaken in this step.

Context analysis. The effectiveness of an audio-visual training module varies with the situation in which it is implemented. An analysis is conducted to discover in what situations (e.g., workshops or college courses) the module is to be used. This analysis includes examination of physical surroundings available for utilization in order to ensure maximum flexibility for the module.

Specification of instructional requirements. The needs analysis uncovers a priority in the field that can be dealt with by using an audio-visual training module. The learner analysis examines the target audience. The context analysis establishes the situations in which the module is to be used. From these analyses, specifications for the module are made. These specifications state what must be done, for whom, and using what approach. These specifications also identify time, cost, and resource constraints.

Task analysis. Here, the instructional topic is analyzed in terms of the information, skills and knowledge that the learner must acquire. Each major element of the content is broken into its component parts. The main task is analyzed into subtasks, each of which is further analyzed until the trainees' entry level is reached. Each subtask is scrutinized, eliminating the superfluous and trivial.

Concept analysis. In addition to the skills and strategies to be acquired by the trainees, there are a number of fundamental concepts which must be mastered. The instructional content is analyzed for its conceptual frameworks. Each concept is isolated and its critical and variable attributes are identified. Examples and nonexamples of these concepts are generated for use in teaching and testing.

Specification of instructional objectives. Just as the context and learner analyses provide the foundation upon which instructional requirements are specified, so the task and concept analyses provide the underlying framework for the instructional objectives. These objectives, expressed in behavioral terms, state clearly and unambiguously what the learner achieves through use of the audio-visual training module. These objectives inform the trainees what they can expect from the module. For the designer, the objectives form the base for the design of the instruction and the construction of criterion-referenced tests.

Design Stage

The specification of instructional requirements and objectives signals the start of the Design stage in the revised 4-D model. This stage involves the steps of media allocation, preparing initial blueprints for the booklet, audiocassette and filmstrip components, making preliminary revisions, producing each component, and assembling the entire audio-visual training module in its prototype form. Specific details of each step in this stage are given below.

Media allocation. In the revised 4-D model, the media components are preselected. The audio-visual training module consists of three major components: a printed booklet, an audiocassette and a filmstrip. The instructional content is systematically distributed to the appropriate component.

Response book. The instructional objectives serve as the base from which criterion-referenced test items are developed. For each objective, an item is written which becomes the reference point toward which instruction is directed. The printed booklet, called the response book, contains these criterion items. As trainees proceed through the module, they are required to respond to the items. Thus, the response book acts as a measure of attainment for each objective and provides the learner with a blueprint for a plan of action geared specifically to his/her situation. Upon completion of the module the learner retains the response book as a permanent and personalized reference. In addition to the learner's own responses, important guidelines, information, checklists, and references are included in the response book.

After the items in the response book are properly sequenced, it is evaluated by different experts. Subject-matter experts examine the response book for accuracy and relevance. Instructional development experts check to see whether the objectives are correctly and logically formulated and whether the criterion items are valid. A language editor reviews the appropriateness of the language and corrects any errors. From these evaluations, a revised response book emerges.

Script. The script for the audiotape, including the cast of characters, narrative, dialogue, and music, is the main teaching component of the module. A storyline, with easily identifiable characters, is created for the script which teaches toward each criterion item of the response book. The narration also provides explanations and direction for other learning activities.

As with the response book, the script goes through repeated evaluation. Subject-matter experts examine it to ensure that the message is carried effectively to the learners. Principles, generalizations, and illustrative examples receive particular scrutiny. In addition, instructional development experts study the script for consistency with the objectives, production experts verify the script for audio quality, and language editors tighten the language. As the script approaches recording, narrators review the script for word changes, emphasis and timing. These evaluations result in a prototype script ready for recording.

Visual storyboard. Just as the script evolves from the criterion items in the response book, the visual storyboard develops as the script is written. The visual component of the audio-visual training module serves three functions:

1) It motivates the learner and maintains his interest level.
2) It provides visual messages which enhance the audio portion.
3) It acts as a focuser of attention.

The visual storyboard is designed parallel to the script, sometimes following from the words of the script, sometimes generating narrative. The visuals in the storyboard are divided into three major categories:

1) Photographs of the characters in action.
2) Photographs of materials or objects.
3) Graphics including artwork and lettering.

Once the visual storyboard is complete, rough sketches and the script are submitted for evaluation to production experts.

Prototype production. When all three major components of the audio-visual training module have been sufficiently revised, they are produced in a prototype form. The response book is typed in its final form. The script is duplicated in the format required for audio production and distributed to narrators. Rehearsals are held for the audio taping session. The script is recorded and edited. The visuals are produced in a series of sessions.

Live shots are photographed on location and graphics are photographed on a copy stand. The end result is a prototype module consisting of an audiotape, a series of slides and a response book.

Assembly. When all components have been produced, assembly takes place. At this stage, the final selection of visuals is made. The response book is duplicated and bound, and the audiocassette is synchronized with the slides. The entire package is checked for internal inconsistency, errors and omissions. Duplicate copies of all components are made, and the prototype module is then submitted for developmental testing.

Developmental testing. Once the prototype audio-visual training module is assembled, it is tested on individuals and groups from the target population. These learners are observed and tested both during and after completing the module. The aim at this stage is not to see how well the learners have learned, but to identify those parts which they find difficult, irrelevant, and confusing. Testing sessions of this nature with individuals or small groups provide extremely valuable feedback for final revisions.

Expert appraisal. At the same time that developmental testing is being conducted, experts from the subject-matter area and instructional technology are asked to review the prototype materials. Their appraisal is focused through various checklists and their comments are collected for future revision.

Revision. As feedback data from developmental testing and expert appraisal come in, revisions are made in the module. The cycle of testing and revision is repeated until learner performance and expert comments appear consistently satisfactory. The total package is now prepared for final production.

Final production. The final audio-visual training module incorporates all the revisions derived from the developmental testing and expert appraisal. The response book is typeset and printed in its final form. The slides are converted to a filmstrip. The audiocassette is edited and duplicated. The total module is assembled and made ready for the field.

Evaluation Stage

After the final production and assembly, the audio-visual training module is subjected to an extensive summative evaluation. The evaluation design is dependent on the content of the modules--is the module a single shot material or does it need testing as part of a larger series? Specific evaluation designs, therefore, flow from the particular requirements of the overall objective for each module.

CHAPTER 2

BASIC ANALYSES

Needs Analysis

The introductory pages of this chapter provide the basic rationale for each module in the series on preinstructional competencies for teachers of the handicapped. This rationale was developed on the basis of discussions with teachers of the handicapped, consulting teachers, school administrators, special education teacher trainers, and pre-service special education teacher trainees. The following are summaries of the salient points which emerged from an in-depth needs analysis of each module.

Module I: Specifying Behavioral Objectives

1. The behavioral objectives movement has an empirical base that demonstrates the effectiveness of using behavioral objectives in education and training.
2. Many states are legislating that teachers must designate specific individualized behavioral objectives for their handicapped learners (e.g., P.L. 198, Michigan).
3. Behavioral objectives form the base for criterion-referenced evaluation (Mager, 1973), which is the most appropriate technique for diagnostic evaluation of handicapped learners.
4. Behavioral objectives can form the basis for the selection of suitable instructional materials for handicapped learners (Rosen, 1975).
5. Behavioral objectives can form the basis for the design of any type of teacher-developed instructional materials.
6. Behavioral objectives form the basis for designing a wide variety of appropriate classroom strategies and learner activities for handicapped children.

7. Behavioral objectives enable meaningful communication with parents of handicapped children concerning the progress of their children. Teachers can describe in demonstrable terms precisely what competencies children have acquired.

8. Behavioral objectives permit the teacher to individualize instruction according to the needs of each child. By varying specified conditions and standards, behavioral objectives can be directly tailored to individual children.

9. Behavioral objectives permit the teachers to communicate with one another and share their ideas concerning instructional strategies and information for individual students. The concreteness of the behavioral objectives offers teachers tangible strategies and meaningful results as a common ground for discussion.

10. Behavioral objectives form a logical progression and sequencing of learning activities for handicapped youngsters and thereby provide continuity as the child proceeds from class to class. Since behavioral objectives are stated at a global level and then broken into smaller enabling objectives, all the various prerequisite activities form a coherent set leading to the attainment of some major objective. These major objectives are also subordinate to greater objectives which may require several years for attainment.

11. Behavioral objectives provide convenient units for planning a lesson in the special education curriculum.

12. Through the use of behavioral objectives, teachers can provide a mastery learning environment which eliminates the competitive atmosphere of normative evaluation.

Module II: Task Analysis

1. Task analysis enables a teacher to derive a rational set of behavioral objectives rather than selecting unrelated sets of items.

2. Task analysis permits the teacher to analyze a main task into all necessary and sufficient subtasks, thus minimizing the number of superfluous and unnecessary tasks which might be taught to the handicapped learner.

3. Task analysis organizes the content of learning into a hierarchial structure. This enables the teacher to identify the optimal instructional sequence.

4. A task analysis provides the basis for diagnostic testing and placement of individual students in an instructional continuum.

5. Task analysis allows teachers to better discriminate between learners who have the prerequisite skills for a given lesson and those who have not yet acquired these skills.

6. Task analysis enables the teacher to break down a major task into a number of small steps that are easier for a handicapped child to manage.

7. Task analysis offers a means for cooperative analysis of an instructional task so that several teachers can share their expertise in developing a useable hierarchy of subtasks in an area of common concern.

8. A task analysis can be converted into a checklist for evaluating the performance of a child.

9. Task analysis forms the basis for tracking the progress of a child as he proceeds toward mastery of a complex main task.

10. Task analysis forms the basis for the systematic planning of lessons.

Module III: Lesson Planning Through Task Analysis

1. Using task analysis, systematic lesson plans can be derived.

2. This lesson-planning technique ensures an effective sequence of objectives. The hierarchy of the task is clearly identified before hand, thus permitting the lesson sequence to be logically and appropriately structured.

3. Lesson planning through task analysis ensures that appropriate materials are selected for each phase of the lesson.

4. Lesson planning through task analysis suggests suitable teacher activities which are relevant to the structure of the task.

5. Lesson planning through task analysis enables the teacher to establish learner activities which are meaningfully related to the instructional task.

6. Lesson planning through task analysis provides logical and functional test items to evaluate and diagnose the performance of handicapped learners. Hence, the built-in test items force monitoring to take place during every lesson.

7. Lesson planning through task analysis makes use of the effort and thought which the teacher puts into the task analyses.

8. Lesson plans based on task analysis are reusable.

9. Lesson plans derived from task analyses communicate both a hierarchy of subtasks and their interrelationships. This permits them to be exchanged among teachers, facilitating planning for all teachers.

10. Lesson plans derived from task analysis can be stored and built up over a period of years.

11. Lesson planning through task analysis provides plans which can be used with parents for helping their handicapped children.

12. The specifications in a lesson plan derived from task analyses demonstrates to parents, to peers, and to administrators the function of each activity and material that a teacher uses.

13. Lesson planning gained from task analysis can readily be converted into self-contained mediated materials.

14. Lesson plans thus derived are so systematically linked that they enable continuity to take place when a teacher is absent or when a pupil moves to another class.

15. Lesson planning through task analysis provides a consistent format for all lessons in the classroom, and thus enables the handicapped learner to focus on the content rather than the format of a new lesson.

16. Lesson planning through task analysis, as a format for preparing lessons, matches strategies for concept lesson planning.

Module IV: Concept Analysis

1. Handicapped children lack a solid base of fundamental concepts which impedes their learning. Therefore, effective teaching of concepts is of prime importance.

2. Concept analysis techniques shift the teacher's focus from verbal definitions and rote learning to nonverbal discrimination and generalization skills.

3. Studies indicate (e.g., Zeaman & House, 1963) that the acquisition of concepts is primarily a function of stimulus presentation. Concept analysis suggests the necessary set of stimulus materials to be presented.

4. The use of conveniently available examples often results in stereotyped understanding and the generalization of concepts. To eliminate this possibility, systematic concept analysis ensures organized presentation of a rational set of objectives.

5. Systematic concept analysis enables the teacher to identify a divergent set of examples for strengthening the ability of the handicapped child to generalize.

6. Systematic concept analysis permits the teacher to identify matched sets of positive-negative examples, focusing the attention of the handicapped child on the critical attributes of a concept.

7. Systematic concept analysis provides novel examples and nonexamples for diagnostic testing of the child's attainment of a concept.

8. Concept analysis provides an instructional sequence for teachers, beginning with clear examples and concluding with close-in nonexamples, to ensure maximim generalization and discrimination of a concept by handicapped learners.

9. Concept analysis translates a number of experimental findings into a set of practical procedures for use by the classroom teacher.

10. Concept analysis provides a base for systematic planning of lessons involving concept acquisition.

11. Concept analysis identifies the prerequisite concepts a child must already possess in order to acquire a new one.

Module V: Planning a Concept Lesson

1. Lesson planning through concept analysis provides a logical sequence for helping handicapped children acquire fundamental concepts that are essential for further learning.

2. The emphasis in lesson planning through concept analysis is on meaningful student participation. This ensures more learning.

3. This type of lesson-planning procedure utilizes built-in evaluation to repeatedly check handicapped learners' attainment of a concept.

4. The concept lesson plan is based on systematic concept analyses that the teacher carries out and enables him/her to translate an analysis into a plan of action.

5. Lesson planning through concept analysis incorporates logical sets of examples and nonexamples to introduce, prompt, and strengthen the mastery of a concept.

6. Lesson planning through concept analysis requires the teacher to devise appropriate learner activities which are relevant to the task of mastering a given concept.

7. Test items used in this type of lesson plan help the teacher diagnose areas of misconception by the student.

8. The concept lesson-planning procedure has built-in decision points which indicate the need for remedial instruction or for more advanced learning activities.

9. Lesson plans thus constructed can be reused and refined over a period of years.

10. Lesson planning derived from concept analysis can be shared among teachers.

11. Lesson planning through concept analysis provides continuity in a teacher's absence or when the child moves on to another class.

12. Lesson planning derived from concept analysis offers a means of communicating, in precise terms, the rationale for each activity and material employed by the teacher.

13. A lesson plan derived from a concept analysis forms the basis for a self-contained instructional material.

14. Lesson planning through concept analysis provides a consistent lesson format for handicapped children in mastering new concepts.

15. Lesson planning through concept analysis harmonizes with other systematic lesson planning activities, such as lesson planning through task analysis.

Module VI: Instructional Games for Handicapped Children

1. Instructional games make many abstract concepts more concrete for handicapped children.

2. Converting the instructional topic into a game provides many insights to the teacher.

3. Games focus and sustain the attention of handicapped children.

4. Games provide repeated practice on fundamental skills in a pleasant fashion.

5. Games provide opportunities for children to acquire social skills.

6. Instructional games provide immediate reinforcement for the mastery of instructional objectives.

7. Games enable children to learn from each other in a collaborative fashion.

8. The teacher can manipulate the chance/skill ratio of games in order to provide equal chances of success for children at different ability levels.

9. Instructional games can be shared with parents, enabling them to reinforce instructional concepts at home without any specialized training.

10. Familiarity with game design principles enables the teacher to use commercial games more effectively with the slow learners.

11. Teachers can modify and adapt existing games for use with handicapped children. These modifications produce more effective learning than the original versions which are frequently designed for use with "normal" children.

12. Many areas in the curriculum for the handicapped lend themselves to active participation on the part of learners. Instructional games offer a means of channeling that activity.

Module VII: Choosing a Curriculum Package

1. Curriculum packages are systematically developed using generous resources beyond the reach of ordinary publishers. They represent the best in content and instructional strategies.

2. Curriculum packages are field-tested and validated with handicapped learners. They are accountable for their success.

3. Curriculum packages have specific behavioral objectives and can be easily integrated into the classroom for the handicapped.

4. By removing the concern about what to teach, curriculum packages enable the teacher to concentrate on how to teach.

5. Curriculum packages structure teacher and learner activities over an extended period of time and thus simplify planning and preparation.

6. Curriculum packages are systematically organized to suit a wide variety of individual differences among handicapped learners.

7. Curriculum packages have built-in evaluation and diagnostic instruments for prescribing suitable remedial and enrichment activities.

8. Curriculum packages provide structure for paraprofessional and volunteer activities in the classroom for handicapped children.

9. Curriculum packages are attractively packaged and learner-tested for a high level of motivation.

10. The content of curriculum packages are extremely adequate, valid, and up-to-date, since they draw upon the resources of top authorities.

11. Curriculum package activities are designed on the basis of sound psychological principles verified by research.

12. Curriculum packages employ a wider variety of instructional media in the presentation of their content to children with different stimulus needs.

Module VIII: Teacher-made reading materials

1. Teacher-made reading materials provide more personally meaningful instruction in reading to handicapped children.

2. Teacher-made reading materials which are tailor-made to the specific levels and interests of individual children provide opportunities for sustained success.

3. More relevant content in teacher-made reading materials improves understanding and interest on the part of handicapped learners.

4. Teacher-made reading materials provide opportunities for handicapped children to become actively involved in planning, writing, and producing reading materials.

5. Teacher-made reading materials increase learner motivation; this enthusiasm transfers to other reading materials.

6. Teacher-made reading materials provide the maximum opportunity to adapt vocabulary, sentence structure and level of language to the capacities of the individual children.

7. Teacher-made stories can incorporate the repetition needed by handicapped learners.

8. Teacher-made reading materials provide reading passages on topics for which commercial materials are either unavailable or inappropriate.

9. Teacher-made reading materials are inexpensive to produce in comparison with their impact on handicapped learners.

10. Teacher-made reading materials can be shared with parents and volunteers for continued reinforcement of reading activities.

11. Teacher-made reading materials expand the resources available for reading.

12. Teacher-made reading materials provide the teacher with insights into the teaching of reading and the use of controlled vocabulary.

13. Teachers who create their own reading materials become more efficient users of basal texts and readers.

Module IX: Classroom Charts for Handicapped Children

1. Classroom charts provide a proven technique for stimulating the interest of handicapped learners in a wide variety of curricular areas.

2. Classroom charts provide a focus for discussion among handicapped learners and thus increase their fluency and expressive skills.

3. The use of classroom charts to provide appropriate reading experience is a validated technique in teaching reading to slow learners.

4. The use of classroom charts elicits student comments and thus encourages them to participate in the teaching-learning process.

5. Very often handicapped children need repeated reviews. Suitable classroom charts enable the teacher to accomplish this objective.

6. Classroom charts provide visual cues for student participation and discussion during class activities.

7. Through designing classroom charts, the teacher is forced to clarify in his/her own mind the content of the lesson.

8. Classroom charts build upon systematic task and concept analysis.

9. Classroom charts enable the teacher to review previous concepts and vocabulary at the beginning of a new lesson.

10. Classroom charts can be independently utilized by small groups of learners to attain instructional objectives.

11. Classroom charts are especially useful for nonverbal presentation of complex tasks and concepts.

12. Classroom charts can be easily used by paraprofessionals and volunteers.

Module X: Classroom Graphics for Handicapped Children

1. Classroom graphics enable the teacher to prepare suitable charts for handicapped children.

2. Graphics can be used to present complex tasks and concepts in a nonverbal fashion to the handicapped learner.

3. Teachers can use graphic skills to make attractive instructional materials.

4. Graphic skills can be applied to a wide variety of instructional media.

5. Where commercial materials are not available for specific needs, the teacher can produce tailor-made visual materials for clarifying concepts.

6. There are many simplified techniques which enable an average teacher to achieve professional-looking results. These techniques are not currently available in training programs for teachers of the handicapped.

7. Simple graphics can be used as effective reinforcers for handicapped learners.

8. Teacher-made graphic materials cost just a fraction of commercially produced materials.

9. Locally produced graphics readily reflect local conditions; they are more personally meaningful to the handicapped.

10. Many basic graphic skills can be taught to paraprofessionals and parents who wish to contribute to classroom activities.

11. Teachers gain insights into the structure of tasks and concepts when they attempt to graphically represent them.

12. Locally designed graphic materials can be shared among teachers in order to build up local resources.

Module XI: Preparing Tutoring Materials

1. Tutoring materials form the core of instructional assistance by paraprofessionals and parents.

2. Tutoring materials support peer-tutoring activities in which handicapped children learn both as tutors and students.

3. Tutoring materials integrate the instructional content and the strategy.

4. The teacher can prepare tutoring materials on high priority lesson topics.

5. Tutoring materials have self-contained flexibility which permits a high degree of individualization.

6. No previous training is necessary for the use of tutoring materials. This enables the teacher to tap volunteer or peer resources without setting up a training system.

7. Tutoring materials have built-in reinforcement for the success of the handicapped learners.

8. Tutoring materials can be easily incorporated into lesson plans.

9. The use of tutoring has been nationally validated over a period of years and found effective (Ellson, 1974).

10. Tutoring materials undergo repeated learner verification and revision with handicapped children before they are implemented.

Learner Analysis

The target population for the series was identified as pre-service and inservice teachers of handicapped children. The term "handicapped children" in this context refers to children who are mildly mentally retarded, learning disabled, or emotionally disturbed. The "teachers" refers to trainees in special education courses, student teachers, teachers in special education classrooms, consulting teachers for the handicapped, and regular-class teachers with handicapped children mainstreamed into their classroom.

To analyze the characteristics of this group of trainees, a questionnaire proposed by Thiagarajan, Semmel, and Semmel (1974) was used. Figure 2.1 shows the questionnaire. Since only minor variations occurred among the learner analyses for each module, only the results of two of them are shown in Figures 2.2 and 2.3, as samples.

Context Analysis

To determine the conditions and constraints under which the modules would be used, a context analysis questionnaire was employed. This questionnaire is shown in Figure 2.4. As the context was constant across all modules, the results of the context analysis for the Task Analysis module are given in Figure 2.5, as an example of the context for all modules.

Specification of Instructional Requirements

Based on the needs, learner, and context analyses, a set of instructional requirements for each of the modules was specified. These requirements were listed under three headings: content requirements, style and format requirements, and utilization requirements. The content requirements differed between modules, whereas the style, format, and utilization requirements remained constant. Figures 2.6 provides the style, format, and utilization requirements for all the modules. Figures 2.7 through 2.17 summarizes the content requirements for each of the modules.

Task Analysis

Based on interviews with subject-matter experts, instructional developers, special education teachers and a study of the available literature on the various topics for the modules, task analyses were performed. Each task analysis began with the specification of the main competency to be acquired by the

Subject-Matter Competence

1. At what levels are the trainees' current knowledge and skills in the subject-matter area?

2. What background experiences do the trainees have in the subject-matter area?

3. Are the trainees likely to have any major misconceptions in the subject-matter area?

Attitudes

4. What are the general attitudes of the trainees toward the instructional content? Are there any subtopics within the content toward which the trainees are likely to feel very positive or very negative?

5. What preferences for instructional format and media do the trainees have?

Language

6. What is the language level of the trainees? How much of the specialized terminology is in their vocabularies?

7. What preferences for style of language (e.g., conversational or scholarly) do the trainees have?

Tool Skills

8. Do the trainees have any sensory-perceptual deficiencies that will require special attention?

9. Can the trainees handle the instructional materials and equipment?

Figure 2.1 Learner analysis questionnaire.

Subject-Matter Competence

Trainees have considerable theoretical knowledge of different types of handicapped children and special classrooms. They are knowledgeable in specific curricular areas; able to work with a topic for instructional game design. They have heard about instructional games and have seen them being used in special classrooms. However, very few of them have considered the possibility of designing a game. Their conception of instructional games is mostly limited to fun activities and "busy work."

Attitudes

The trainees' general attitude toward designing instructional games is positive, although they are somewhat skeptical as to the games' uses. Most of them believe that a game could be designed very easily, and the amount of time required for the design, tryout, and modification of a game will increase their skepticism.

These trainees do not like a textbook-lecture approach. They will respond positively to a self-instructional media package.

Language

Specialized instructional-design and game-design terminology is not a part of the trainees' vocabularies. They can, however, handle fairly sophisticated terminology about handicapped children and special education. Trainee preference is for a conversational, rather than a "textbookish," style.

Tool Skills

Trainees do not have any major handicapping conditions. They will be able to handle media equipment with some instructions.

Figure 2.2 Learner analysis for the audio-visual training module on instructional games for handicapped children.

Subject-Matter Competence

Trainees have received some degree of professional training in education, and some knowledge--either theoretical or practical--of handicapped children. Some teacher training programs require art education and/or audio-visual courses while others do not, so the design of this module assumes no previous special knowledge or expertise in producing classroom visual materials.

Attitudes

Trainee attitudes toward use of graphic materials in the classroom range from positive to very positive. Self-appraisal of trainee ability to produce satisfactory classroom materials of their own range from very negative to slightly positive.

Trainee attitudes toward the use of individually accessable self-paced materials is generally positive, with the reservation that most learners are uneasy about being asked to operate audio-visual machinery.

Language

Trainees possess a sophisticated vocabulary about education, but generally have little background in the use of technical art or audio-visual terms. They prefer simple, conversational English with concrete and familiar examples, and a minimum of technical jargon.

Tool Skills

Trainees do not have any major handicapping conditions, but are untrained in the manipulative skills required in assembling graphic art materials.

Figure 2.3 Learner analysis for an audio-visual training module on classroom graphics for handicapped children.

1. Who are the major target-trainees?
2. Is the material to be used with an instructor?
3. What major delivery systems are required?
4. How is the material to be introduced and integrated into a total program?
5. What support facilities are available?
6. What media equipment is available?
7. What extrinsic reward systems are operative?
8. What type of testing and grading is employed?
9. What are the cost constraints?
10. What are the scheduling constraints?

Figure 2.4 Context analysis questionnaire.

1. Target-trainees. Both pre-service and inservice teachers of the handicapped.
2. Instructor. For inservice trainees, a coordinator issues the task analysis material and monitors its use. For pre-service trainees, there is a faculty advisor.
3. Delivery systems. Essentially for individual or small-group use, but capable of being used with large groups as well.
4. Introduction/integration into a total program. Modular format to permit flexible use in a variety of special education courses.
5. Utilization facilities. Learning resource centers, libraries, study carrels, student home facilities.
6. Media equipment. Individual filmstrip viewers, audiocassette players, synchronized-sound filmstrip viewers.
7. Extrinsic reward system. For inservice teachers, the task analysis module can form part of a course for college credit, i.e. be applied toward certification. For pre-service trainees, the module contributes toward course credit.
8. Testing and grading. As the module is competency-based, tests are performance-oriented and grading follows a mastery-learning format.
9. Cost constraints. Under $50 purchase price for the complete module.
10. Scheduling constraints. The module must be of less than 60 minutes duration, and provide for approximately 30 to 60 minutes of follow-up activities.

Figure 2.5 Context analysis for an audio-visual training module on task analysis.

Style and Format Requirements

1. Assume minimal competencies on the part of the trainee related to the content of the module.
2. Use a conversational, but at the same time professional, language with a minimum of technical terminology.
3. Incorporate a large number of examples that relate very specifically to the problems teachers of the handicapped face every day.
4. Provide ample opportunity for actual practice of the preinstructional competencies presented in the module.
5. Use a variety of teachers from all walks of life and from various ethnic backgrounds as model teachers with whom trainees can identify.

Utilization Requirements

1. The module should be self-contained, without any need for an instructor.
2. The module should permit flexible use with individuals, small groups, and large groups.
3. The module should be portable to permit easy delivery to different places.
4. The module should be compatible with the most commonly available filmstrip projectors and audiocassette recorders.
5. The cost of the module should not exceed $50.
6. The actual viewing time for the module should not exceed 30 minutes.

Figure 2.6 Specification of instructional requirements for all modules in the preinstructional competencies series: style, format requirements and utilization requirements.

1. Identify the major components of an instructional objective. Provide practice in discriminating between acceptable and unacceptable behavioral terms.
2. Provide practice in writing behavioral objectives complete with acceptable conditions and standards.
3. Provide practice in assembling series of behavioral objectives that coherently relate to one another.
4. Have trainees write, edit and rewrite behavioral objectives. Get them to cross edit and critique each other in order to eliminate trivial types of objectives.

Figure 2.7 Content requirements for specifying behavior objectives.

1. Outline a simple yet systematic procedure for doing a task analysis using nontechnical language.
2. Show how task analysis organizes the content of learning into a hierarchical structure in which all parts are logically connected.
3. Specify means of pinpointing handicapped learners' entry levels.
4. Link task analysis to the structuring learning sequences.
5. Outline ways the teacher can use task analysis to 1.) communicate with parents, colleagues, and administrators, 2.) diagnose handicapped learners, and 3.) evaluate the performance of a child.

Figure 2.8 Content requirements for task analysis.

1. Show how task analysis forms the base for lesson planning. Stress that this approach is less time-consuming than many other lesson-planning techniques.
2. Provide a lesson plan form that links the task analysis to the systematic specification of behavioral objectives for a lesson, selection of materials, specification of teacher and pupil activities, statement of test items, and form of remediation to apply when a handicapped child does not meet criterion.
3. Present lesson planning through task analysis as a means of providing a solid rationale for all lesson activities in a form others, particularly parents, can comprehend.
4. Offer lesson planning through task analysis as a means of building up over the years systematically planned lessons which can be shared among teachers.

Figure 2.9 Content requirements for lesson planning through task analysis.

1. Identify concept analysis as the most effective means of structuring strategies for providing handicapped learners with the host of fundamental concepts they require to cope with the world around them. The emphasis must be on the prime importance of effective concept teaching for the handicapped child.
2. Describe in detail how a teacher can define a concept in terms of its critical and variable attributes.
3. Provide practice in creating examples, nonexamples, and matched positive and negative examples as a means of clarifying the critical attributes of a concept to the handicapped learner.
4. Stress the importance of generalization and discrimination in concept acquisition. Relate this to the problems of over- and undergeneration.

Figure 2.10 Content requirements for concept analysis.

1. Introduce lesson planning through the use of concept analysis as a means of systematically structuring concept lessons for handicapped learners, i.e., a means of translating concept analysis to a plan of action.
2. Outline the procedure for planning a concept lesson including: incorporation of logical sets of examples and nonexamples to introduce a concept, specification of learner activities, specification of test items, and decision points for remedial instruction. Stress that this lesson-planning approach reduces the time a teacher requires to design useful and usable lesson plans.
3. Link important factors such as communicability of the lesson plan, reusability of accumulated concept lesson plans, and the possibility of sharing plans with other teachers, to the inherent beneficial aspects of this technique.
4. Stress that this lesson-planning approach harmonizes with lesson planning through task analysis.
5. As the entire concept analysis technique is very new to the trainees, provide profuse and familiar examples to illustrate how concept lesson planning has been utilized by other teachers of the handicapped.

Figure 2.11 Content requirements for planning a concept lesson.

1. Discuss the use, modification, and adaptation of instructional games for handicapped children.
2. Provide a rationale for the use of instructional games with handicapped children.
3. Offer some typical frame games as examples of games which lend themselves to adaptation for new content and use in a wide variety of curriculum areas.

Figure 2.12 Content requirements for instructional games for handicapped children.

1. Describe what a curriculum package is and show how it has been systematically developed to assist teachers of handicapped learners individualize more readily.
2. Provide a model for teachers to use in assessing the usability of a curriculum package for his/her context.
3. Point out the advantages and disadvantages curriculum packages have for teachers of the handicapped.

Figure 2.13 Content requirements for choosing a curriculum package.

1. Describe how teacher-made reading materials provide more personally meaningful reading instruction for the handicapped learner, and how this type of locally produced materials, through involvement of both teacher and child, can increase a child's interest in reading.
2. Provide a systematic procedure for teachers to follow in preparing their own reading materials.
3. Discuss ways teachers can utilize parents and volunteers in the preparation of teacher-made reading materials.
4. Include methods for incorporating teacher-made reading materials with commercially available curriculum materials.

Figure 2.14 Content requirements for teacher-made reading materials.

1. Demonstrate how classroom charts can stimulate the interest of handicapped learners in a wide variety of curricular areas.
2. Integrate the design of classroom charts with the various types of analyses teachers can use to plan lessons.
3. Provide an assortment of design techniques for preparing classroom charts.

Figure 2.15 Content requirements for classroom charts for handicapped children.

1. Present basic information related to possibilities and limitations involved in designing and using teacher-made classroom visual materials.
2. Discuss basic design principles involved in building successful classroom graphic materials.
3. Provide trainee practice and exercises for acquiring rudimentary skills in designing and producing typical classroom visuals.

Figure 2.16 Content requirements for classroom graphics for handicapped children.

1. Describe a systematic procedure teachers can follow for preparing tutoring materials which can be used by paraprofessionals, volunteers and parents.
2. Relate the tutoring materials to the need for individualization on the part of handicapped learners and explain how the "tutoraid" approach to the preparation of tutoring materials permits the teacher to be aware of what both tutor and child are doing at any moment.
3. Describe the procedures a teacher can follow in preparing his/her tutoring materials for learner verification and revision.

Figure 2.17 Content requirements for preparing tutoring materials.

trainee. These main tasks were then analyzed into the sufficient and necessary subtasks required for the competency. The subtasks were then further analyzed into prerequisite competencies until the entry level of the trainees was reached. The task analyses were then carefully reviewed by both content experts and instructional developers. All trivial, superfluous, and unnecessary subtasks were eliminated. The leanest possible structure for the acquisition of the specified main competency was thus derived. Figures 2.18 to 2.28 contain the final edited versions of the task analyses for each of the modules.

Specification of Instructional Objectives

Based on the task analysis performed for each of the modules, sets of instructional objectives were derived. These objectives were matched against the instructional requirements in order to ensure that they harmonized with skills teachers of handicapped children actually require. Wherever discrepancies between the requirements and the objectives were discovered, changes were made either by deleting superfluous objectives or adding necessary ones. The objectives for each of the modules are contained in Figures 2.29 to 2.39. Both the general overall objective and the enabling objectives for each module are given.

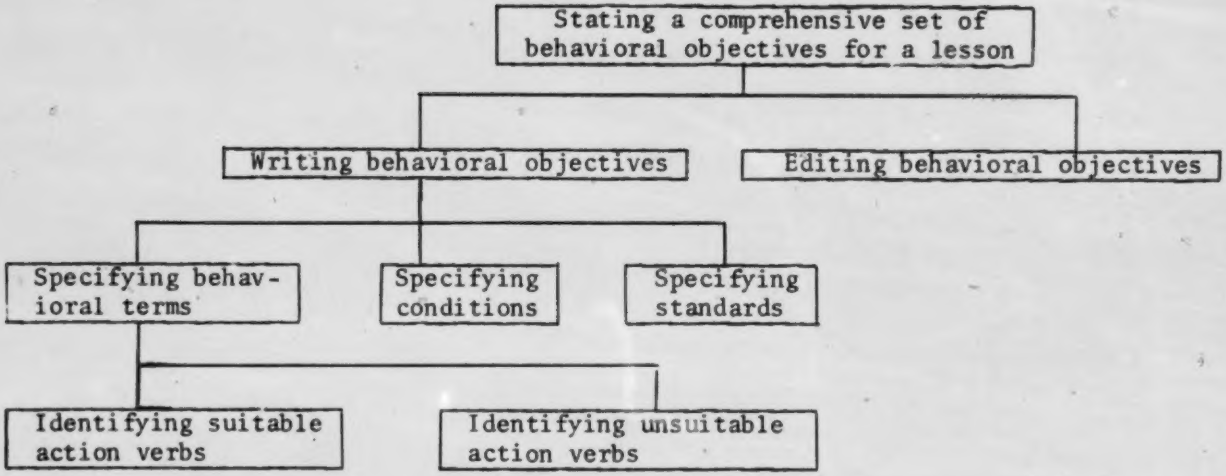

Stating a comprehensive set of behavioral objectives for a lesson
Writing behavioral objectives
Editing behavioral objectives
Specifying behav-ioral terms
Specifying conditions
Specifying standards
Identifying suitable action verbs
Identifying unsuitable action verbs

Figure 2.18 Task analysis for the module on specifying behavioral objectives.

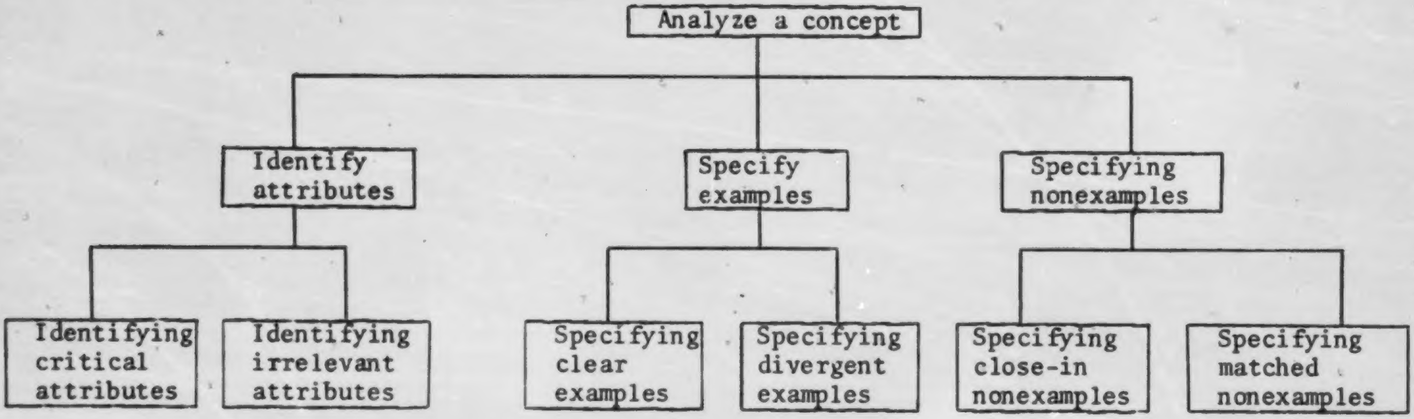

Analyze a concept
Identify attributes
Specify examples
Specifying nonexamples
Identifying critical attributes
Identifying irrelevant attributes
Specifying clear examples
Specifying divergent examples
Specifying close-in nonexamples
Specifying matched nonexamples

Figure 2.19 Task analysis for the module on concept analysis.

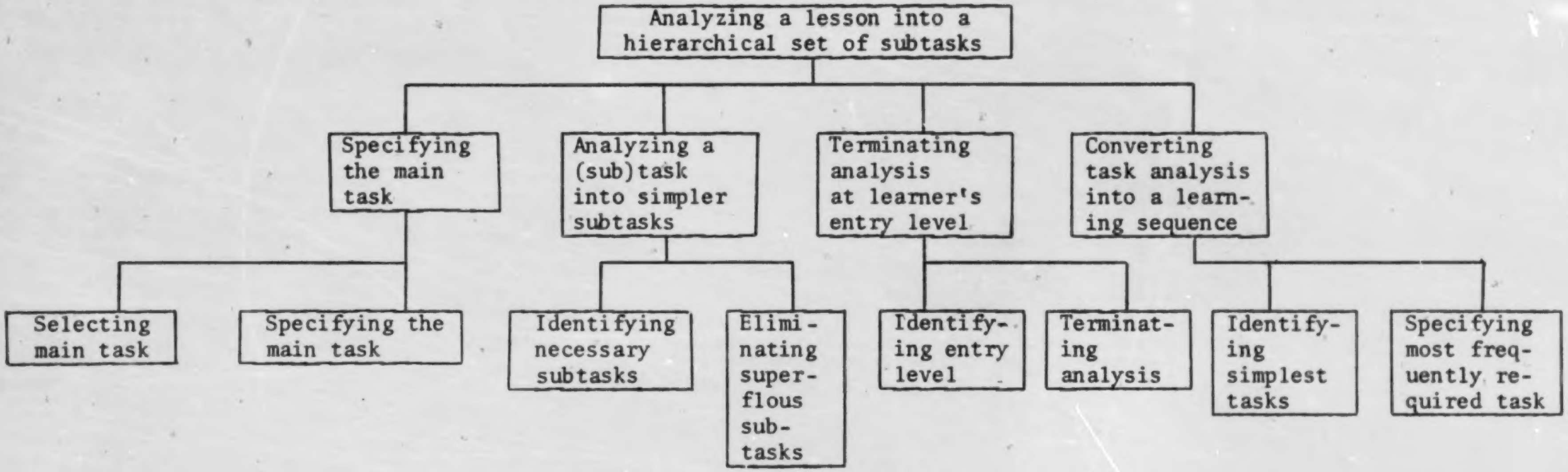

Analyzing a lesson into a hierarchical set of subtasks
Specifying the main task
Analyzing a (sub)task into simpler subtasks
Terminating analysis at learner's entry level
Converting task analysis into a learning sequence
Selecting main task
Specifying the main task
Identifying necessary subtasks
Eliminating superflous subtasks
Identifying entry level
Terminating analysis
Identifying simplest tasks
Specifying most frequently required task

Figure 2.20 Task analysis for the module on task analysis.

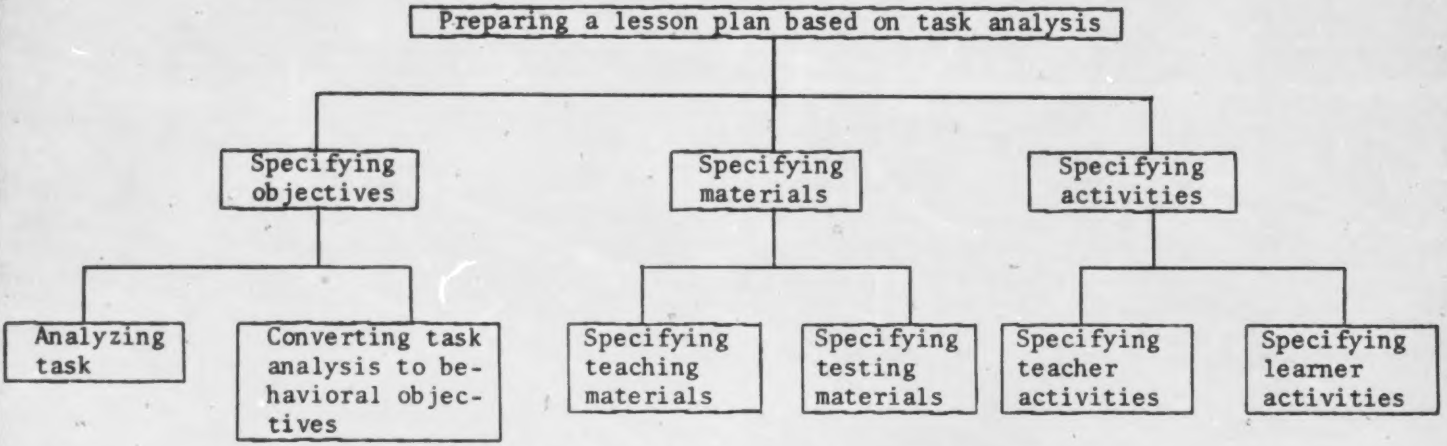

Preparing a lesson plan based on task analysis
Specifying objectives
Specifying materials
Specifying activities
Analyzing task
Converting task analysis to behavioral objectives
Specifying teaching materials
Specifying testing materials
Specifying teacher activities
Specifying learner activities

Figure 2.21 Task analysis for the module on lesson planning through task analysis.

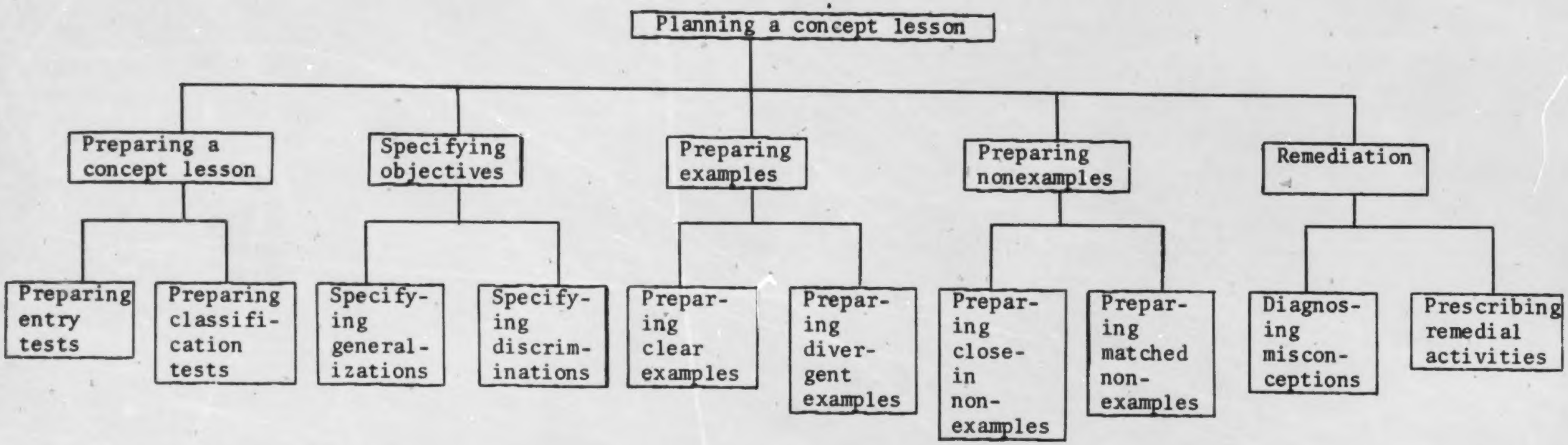

Planning a concept lesson
Preparing a concept lesson
Specifying objectives
Preparing examples
Preparing nonexamples
Remediation
Preparing entry tests
Preparing classification tests
Specifying generalizations
Specifying discriminations
Preparing clear examples
Preparing divergent examples
Preparing close-in non-examples
Preparing matched non-examples
Diagnosing misconceptions
Prescribing remedial activities

Figure 2.22 Task analysis for the module on planning a concept lesson.

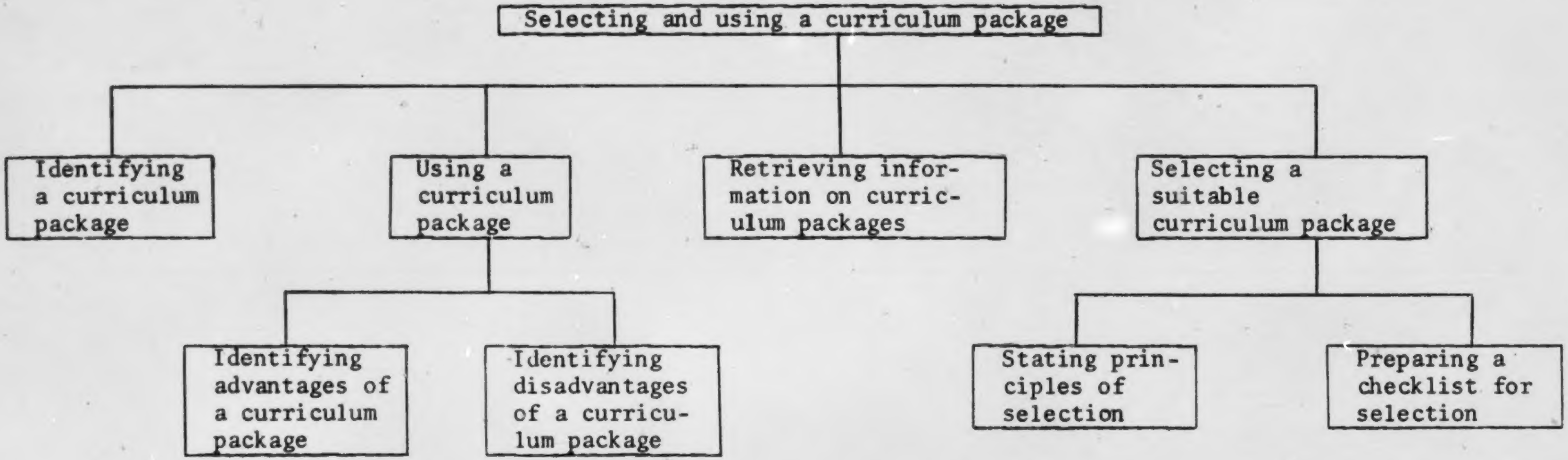

Selecting and using a curriculum package
Identifying a curriculum package
Using a curriculum package
Retrieving information on curriculum packages
Selecting a suitable curriculum package
Identifying advantages of a curriculum package
Identifying disadvantages of a curriculum package
Stating principles of selection
Preparing a checklist for selection

Figure 2.23 Task analysis for the module on choosing a curriculum package.

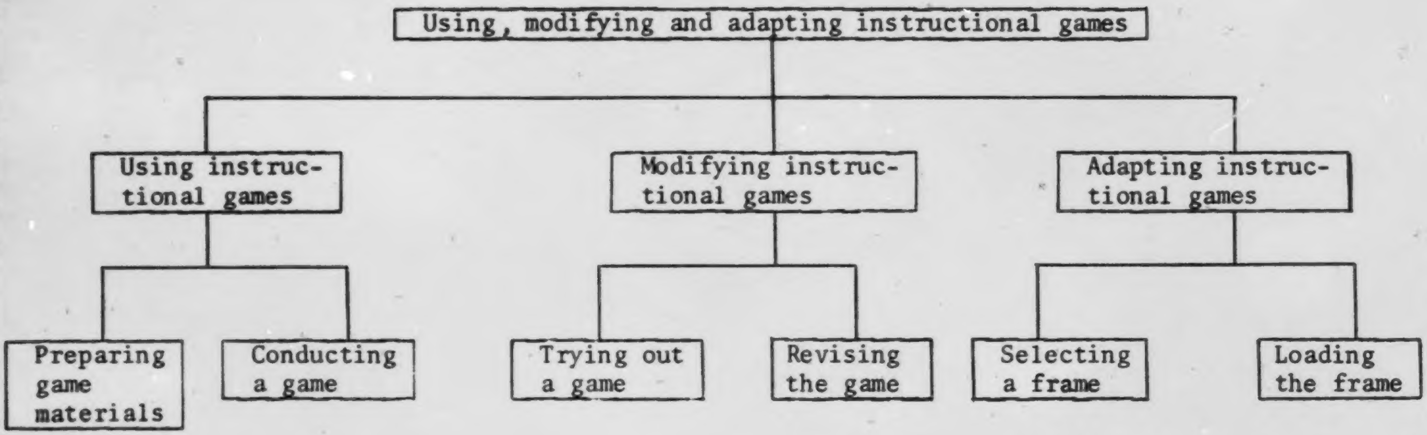

Using, modifying and adapting instructional games
Using instructional games
Modifying instructional games
Adapting instructional games
Preparing game materials
Conducting a game
Trying out a game
Revising the game
Selecting a frame
Loading the frame

Figure 2.24 Task analysis for the module on instructional games for handicapped children.

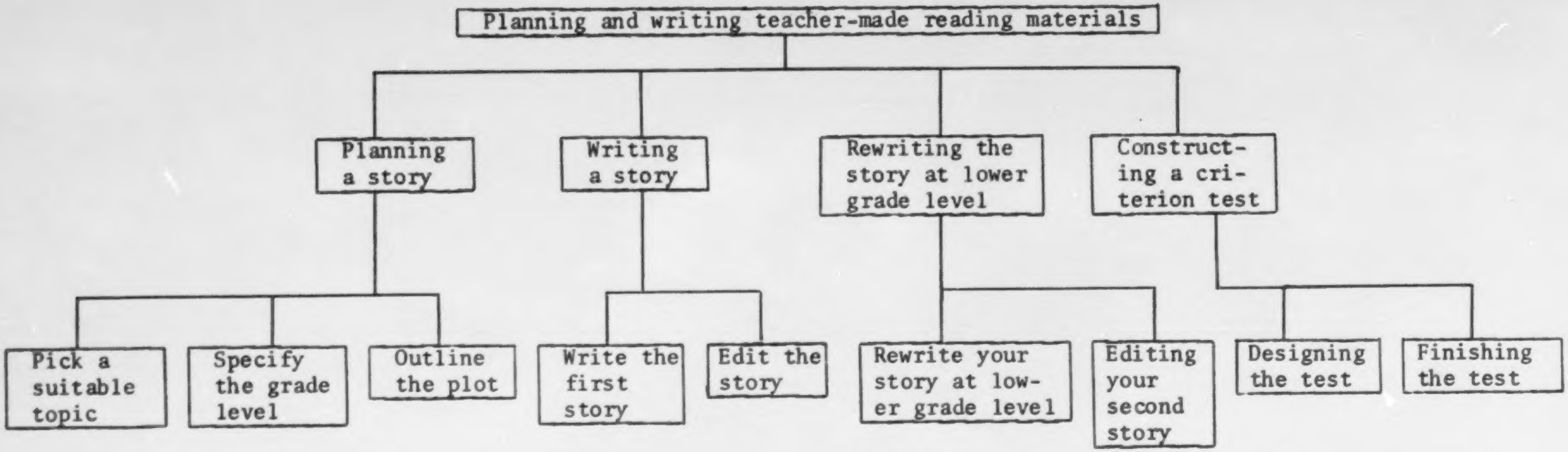

Planning and writing teacher-made reading materials
Planning a story
Writing a story
Rewriting the story at lower grade level
Constructing a criterion test
Pick a suitable topic
Specify the grade level
Outline the plot
Write the first story
Edit the story
Rewrite your story at lower grade level
Editing your second story
Designing the test
Finishing the test

Figure 2.25 Task analysis for the module on teacher-made reading materials.

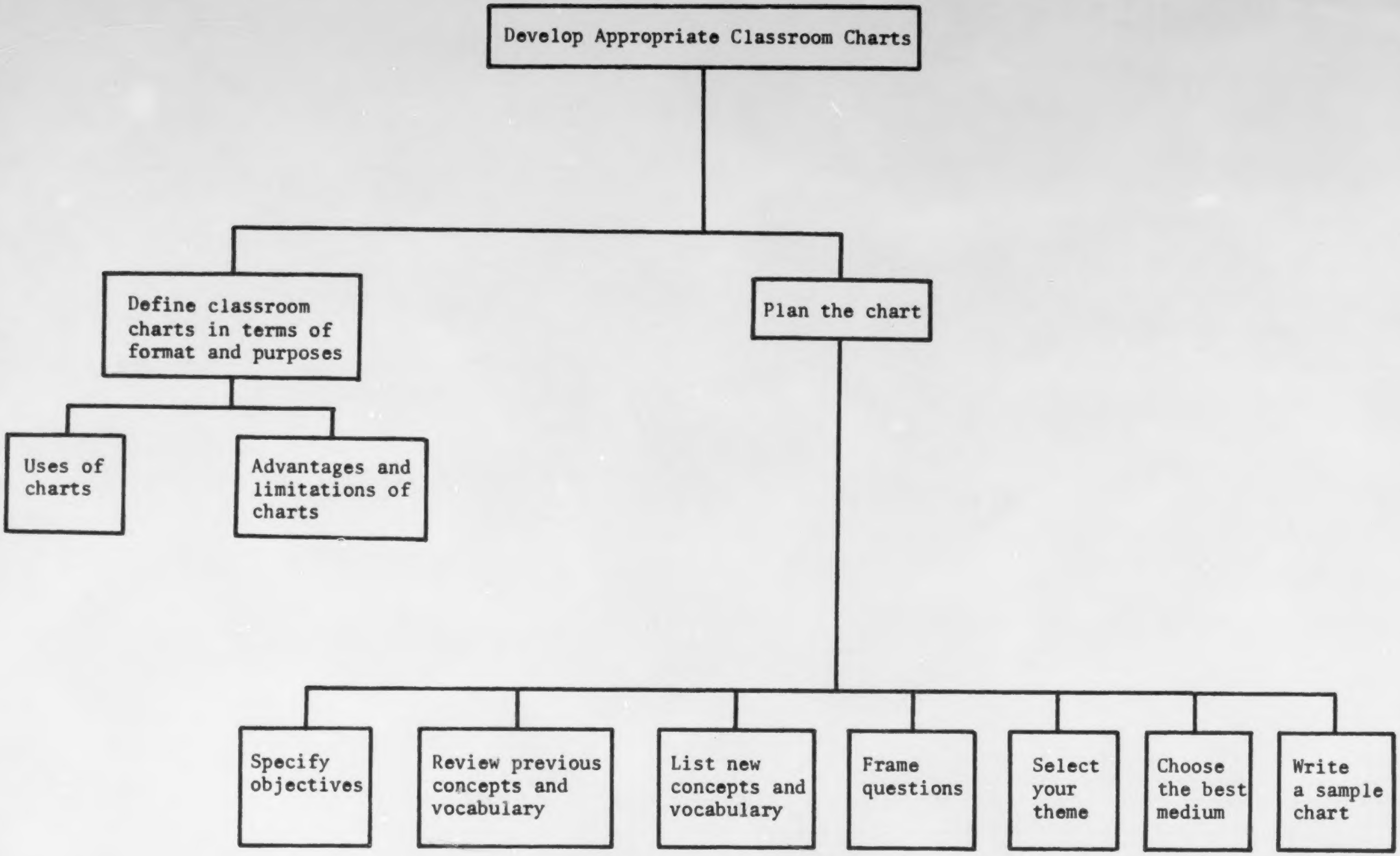

Develop Appropriate Classroom Charts
Define classroom charts in terms of format and purposes
Plan the chart
Uses of charts
Advantages and limitations of charts
Specify objectives
Review previous concepts and vocabulary
List new concepts and vocabulary
Frame questions
Select your theme
Choose the best medium
Write a sample chart

Figure 2.26 Task analysis for the module on preparing classroom charts for handicapped children.

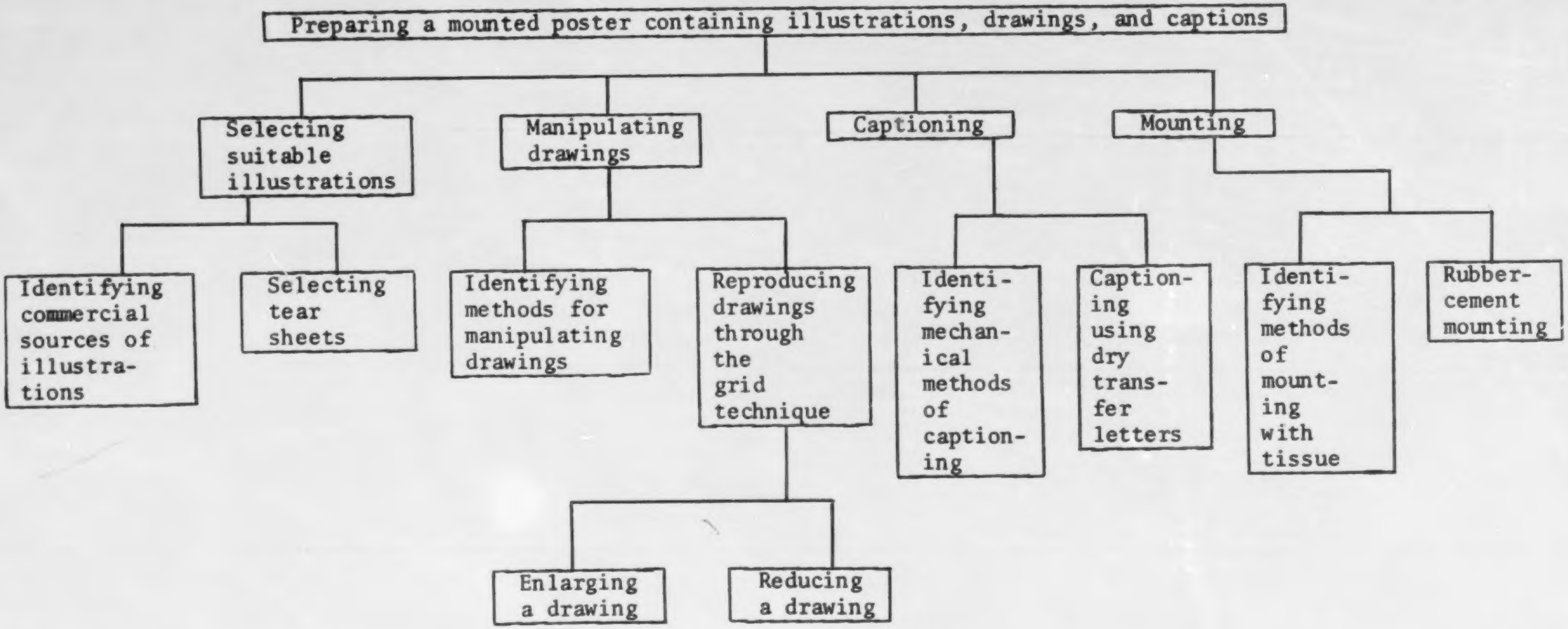

Preparing a mounted poster containing illustrations, drawings, and captions
Selecting suitable illustrations
Manipulating drawings
Captioning
Mounting
Identifying commercial sources of illustrations
Selecting tear sheets
Identifying methods for manipulating drawings
Reproducing drawings through the grid technique
Identifying mechanical methods of captioning
Captioning using dry transfer letters
Identifying methods of mounting with tissue
Rubber-cement mounting
Enlarging a drawing
Reducing a drawing

Figure 2.27 Task analysis for the module on classroom graphics for handicapped children.

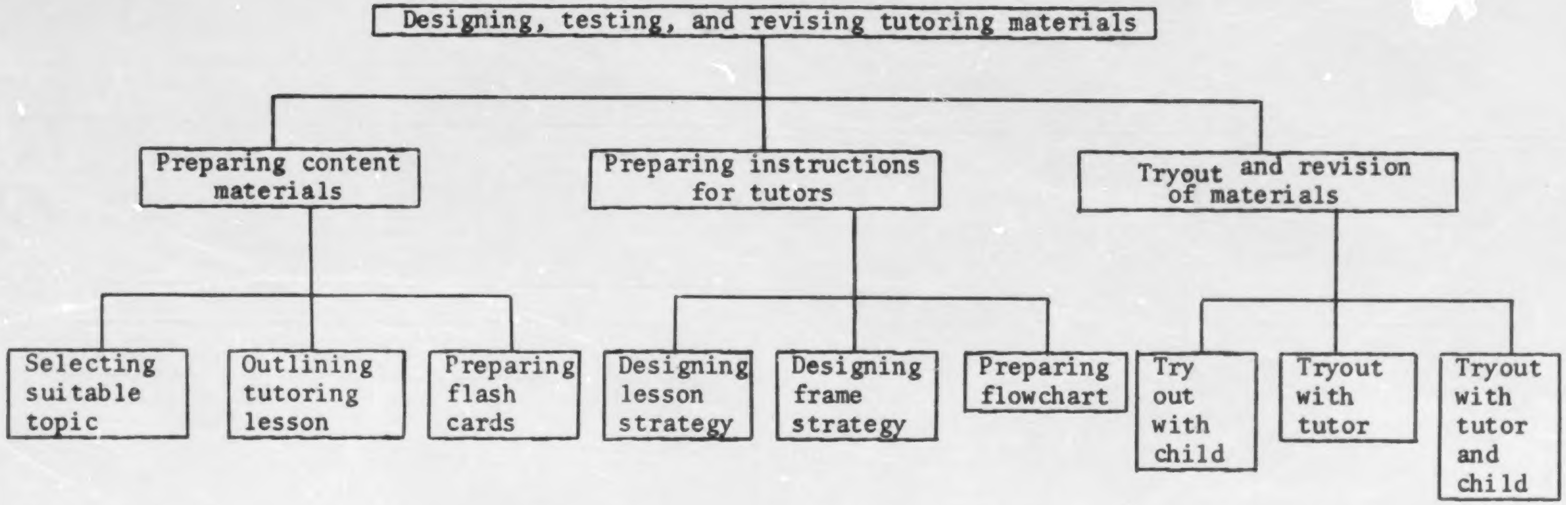

Designing, testing, and revising tutoring materials
Preparing content materials
Preparing instructions for tutors
Tryout and revision of materials
Selecting suitable topic
Outlining tutoring lesson
Preparing flash cards
Designing lesson strategy
Designing frame strategy
Preparing flowchart
Try out with child
Tryout with tutor
Tryout with tutor and child

Figure 2.28 Task analysis for the module on preparing tutoring materials.

GENERAL OBJECTIVE: The teacher trainee will be able to state a comprehensive set of behavioral objectives for a lesson of his/her own choice.

SPECIFIC OBJECTIVES:

1. IDENTIFY action verbs which are suitable for use in statements of behavioral objectives.
2. IDENTIFY instructional objectives which are unacceptable even though they contain a behavioral term.
3. WRITE a complete instructional objective which contains a behavioral term, conditions and standards.
4. Given an incomplete behavioral objective, ADD suitable standards for the student's performance.
5. EDIT and REWRITE a behavioral objective using a checklist.

Figure 2.29 Objectives for the module on specifying behavioral objectives.

GENERAL OBJECTIVE: Upon completion of the module, the teacher will be able to analyze a self-selected lesson topic into a hierarchical set of necessary and sufficient subtasks.

SPECIFIC OBJECTIVES:

1. SPECIFY a main task appropriate for undergoing task analysis.
2. IDENTIFY subtasks at the preceding level of difficulty.
3. TREAT each subtask as a main task and IDENTIFY simpler tasks at preceding levels of difficulty.
4. STOP the analysis when a subtask reaches the pupil's entry level.
5. CONVERT a task analysis into a learning sequence.

Figure 2.30 Objectives for the module on task analysis.

GENERAL OBJECTIVE: Upon completion of the module, you will be able to prepare a lesson plan based on an analysis of a main task.

SPECIFIC OBJECTIVES:

1. CONVERT each item of a task analysis to a behavioral objective.
2. SPECIFY materials required to help learners attain each stated objective in the lesson plan.
3. SPECIFY teacher activities which will help the learners attain the objectives in the lesson plan.
4. SPECIFY children's activities which will help them attain each objective in the lesson plan.
5. CONSTRUCT a criterion item to test the attainment of each objective in the lesson plan.

Figure 2.31 Objectives for the module on lesson planning through task analysis.

GENERAL OBJECTIVE: The teacher trainee will be able to select a fundamental concept in the lesson he/she teaches, identify the critical and irrelevant attributes of the concept, and collect or create a set of suitable examples and nonexamples for teaching and testing.

SPECIFIC OBJECTIVES:

1. DEFINE and GIVE EXAMPLES of the following concepts: (a) concept, (b) example, (c) nonexample, (d) attribute, (e) critical attribute, and (f) irrelevant attribute.
2. IDENTIFY critical and irrelevant attributes of a concept selected from any lesson you plan to teach.
3. COLLECT or CREATE a set of (a) clear examples and (b) divergent examples of the concept you selected, using the lists of critical and irrelevant attributes.
4. COLLECT or CREATE a set of (a) close-in nonexamples and (b) matched example-nonexample pairs of the concept you selected using the lists of critical and irrelevant attributes.

Figure 2.32 Objectives for the module on concept analysis.

GENERAL OBJECTIVE: The teacher will be able to prepare a lesson for teaching a concept of his/her own choice. The lesson plan should include the sequence of steps, entry tests and posttests, the nature of examples to be used in different stages of teaching and testing, and specification of learner responses.

SPECIFIC OBJECTIVES:

1. PREPARE an entry test to check the learner for prerequisite discriminations.
2. PREPARE a classification test to check the learner's mastery of the concept and to diagnose his error patterns.
3. SPECIFY the objective for a concept lesson in terms of generalizations and discriminations to be demonstrated by the learner.
4. SELECT a set of clear examples to introduce the concept to the learners.
5. SELECT matched sets of examples and nonexamples to provide discrimination training to learners.
6. SELECT a set of divergent examples to extend the learner's range of generalization.
7. PREPARE a set of examples and nonexamples to provide practice to the learners in generalizing the concept.
8. INTERPRET individual learner's performance on the classification test.
9. PRESCRIBE suitable remedial instruction for the individual learner on the basis of his performance on the classification test.

Figure 2.33 Objectives for the module on planning a concept lesson.

GENERAL OBJECTIVE: The trainee will be able to modify instructional games for use with handicapped children in his/her classroom and adapt existing games to present new topics.

SPECIFIC OBJECTIVES:

1. EXPLAIN the advantages of using instructional games with handicapped children.
2. Given sufficient directions, PREPARE play materials for an instructional game and USE them with handicapped children.
3. TRY OUT a given instructional game with handicapped children and MODIFY it to make it more suitable for the children.
4. ADAPT a given instructional game to teach a new instructional topic.

Figure 2.34 Objectives for the module on instructional games for handicapped children.

GENERAL OBJECTIVE: The trainee shall list the seven critical attributes of all good packages, list their advantages and disadvantages, and apply principles of selection in choosing a curriculum package.

SPECIFIC OBJECTIVES:

1. STATE several critical attributes of a curriculum package.
2. LIST the advantages of using curriculum packages in the classroom.
3. LIST the disadvantages of using curriculum packages in the classroom.
4. IDENTIFY appropriate places to get information about curriculum packages.
5. STATE the principles of curriculum package selection for use in the classroom.
6. USE a checklist to help make a selection of a curriculum package.

Figure 2.35 Objectives for the module on choosing a curriculum package.

GENERAL OBJECTIVE: The trainee shall plan and write materials matched to the reading achievement level and interests of handicapped children.

SPECIFIC OBJECTIVES:

1. LIST the steps in planning materials.
2. WRITE materials at a selected grade level.
3. REWRITE these materials at lower grade levels.
4. DESIGN a criterion test to ascertain whether students are meeting the objectives set for the materials.

Figure 2.36 Objectives for the module on teacher-made reading materials.

GENERAL OBJECTIVE: The trainee shall be able to develop a classroom chart of his/her own, taking into consideration the nature of the learners, the content to be taught, the medium to be used, the timing of presentation, and the chart's intended purpose.

SPECIFIC OBJECTIVES:

1. DEFINE classroom charts in terms of format and purpose.
2. IDENTIFY three media in which classroom charts can be produced.
3. LIST a variety of uses to which classroom charts can be put.
4. RELATE the educational uses of classroom charts to the timing of their presentation.
5. OUTLINE six steps involved in planning a classroom chart.
6. STATE advantages and limitations of the use of classroom charts.
7. PLAN a classroom chart for specified educational purpose.

Figure 2.37 Objectives for the module on classroom charts.

GENERAL OBJECTIVE: The student will acquire a basic body of knowledge about available possibilities for using graphic materials in the classroom and will learn four specific skills for making his own visual materials.

SPECIFIC OBJECTIVES:

1. LIST a variety of presentation modes which use teacher-made graphic materials.
2. ENLARGE or REDUCE a line drawing using the squaring method.
3. CREATE captions suitable for classroom use utilizing dry transfer letters.
4. MOUNT materials for display using the permanent rubber cement mounting technique.
5. CREATE a classroom poster using manipulation of line drawings, tear sheets, dry transfer letters, and rubber cement.

Figure 2.38 Objectives for the module on classroom graphics for handicapped children.

GENERAL OBJECTIVE: The teacher will be able to prepare, tryout, and revise a specific type of tutoring kit which includes a set of flashcards for the learner and a performance aid for the tutor.

SPECIFIC OBJECTIVES:

1. USE tutoring materials in a simulated situation.
2. SELECT a suitable skill to be taught through the tutoring materials.
3. OUTLINE a tutorial lesson on the selected skill.
4. PREPARE a set of flashcards for use in tutoring the selected skill.
5. DESIGN the strategy for a tutoring lesson.
6. DESIGN the strategy for individual items of the lesson.
7. PREPARE a performance aid for the tutor's reference.
8. TEST the tutoring material with a child and make suitable revisions.
9. TEST the tutoring material with a tutor and make suitable revisions.
10. TEST tutoring materials with a tutor and a child and make suitable revisions.

Figure 2.39 Objectives for the module on designing tutoring materials.

CHAPTER 3

DESIGN AND DEVELOPMENT OF THE MODULES

Once all the analyses were completed and the instructional requirements and objectives specified, the design and production of the actual audio-visual modules began. The activities carried out in this stage are described below.

Media Allocation

The preselected audio-visual media combination consisted of a response book, audiocassette and filmstrip. Once the objectives and requirements were specified, allocation of the instructional message to these different media components took place. Following the rationale employed in the revised 4-D Model, each component was designed to carry that part of instruction for which it was best suited.

Design of Response Book

The response book for each module contains the following four major items:

1. The objectives of the module.
2. Criterion-referenced test items which match these objectives.
3. A permanent record of the trainees' responses and hence a set of personal guidelines for implementing the preinstructional competencies contained in the module in their own classrooms.
4. Useful hints and follow-up readings.

The criterion-referenced items were developed from the objectives. As the script for the audiocassette was developed, these items were adapted to fit a story line. Examination of any of the response books shows the match between the objectives and the criterion items. Figure 3.1

Objective 1:

SELECT a suitable skill to be taught through the use of tutoring materials.

Criterion Item:

What skill are you going to teach with your tutoring material? Describe it briefly here.

Objective 2:

OUTLINE a tutorial lesson on the selected skill.

Criterion Item:

Prepare an outline for your tutoring material by:

1. *Writing down the specific objective.*
2. *Specifying the flashcard format at different levels of difficulty.*

Objective 3:

PREPARE a set of flash cards for use in tutoring the selected skill.

Criterion Item:

Prepare a complete set of flash cards. You will need a packet of 3 x 5 index cards and felt-tipped pens of different thicknesses for this task.

Objective 4:

DESIGN the strategy for a tutoring lesson.

Criterion Item:

Design the strategy for your tutoring lesson by specifying:

1. *Criterion for mastery.*
2. *Procedure for reviewing flash cards.*
3. *Sequence of presentation of the flash cards.*

Figure 3.1 Objectives and matching criterion items for the module on designing tutoring materials.

Objective 5:

DESIGN the strategy for the individual items of the lesson.

Criterion Item:

Design a tutoring strategy for individual flash cards in your tutoring material.

Write down a list. Make sure that these steps form a brightening sequence from the most difficult form of the task to the easiest one.

Objective 6:

PREPARE a performance aid for the tutor's reference.

Criterion Item:

Using the tutoring strategy for the individual flash cards which you have specified, prepare a flowchart for use by your tutors.

Objective 7:

TRY OUT the tutoring material with a child and make necessary revisions.

Criterion Item:

Try out your tutoring material with four or five individual children. Make suitable revisions on the basis of their performance.

Objective 8:

TRY OUT the tutoring material with a tutor and make suitable revisions.

Criterion Item:

Try out your tutoring material with one or two individual tutors. Have them tutor you while you play the role of a slow child. Make suitable modifications.

Figure 3.1 Continued.

Objective 9:

TRY OUT the tutoring material with a tutor and a child and make suitable revisions.

Criterion Item:

Try out your tutoring material with one or more tutors and children. Make suitable modifications.

Figure 3.1 Continued.

shows the match between objectives and the criterion items for the module on designing tutoring materials.

Scripting

The audio script for each module follows a standard format. Trainees are introduced to a teacher or teachers of the handicapped who are engaged in trying to solve some particular problem. Through narration and dialogue in a school setting, trainees vicariously share in the problems and experiences of these teachers. The scripts always lead the trainees toward each criterion item of the response books. Trainees are then required to respond actively with reference to their own personal experiences. How would they help the teachers? What would they do in planning their own programs? The scripts provide feedback to the trainees, allowing them to evaluate their own responses. Figure 3.2 provides a segment of a sample script that exemplifies the techniques described above. The script segment is from the module on planning a concept lesson.

Visual Storyboarding

As each script evolved, so did the visual storyboard for the module. In the design of the visuals, attention was paid to various principles of perception (Fleming, 1970) and to the careful integration of the visuals with the audio script. The visual storyboard received repeated evaluations from subject-matter experts and technical specialists. A sample visual storyboard is described in verbal form beside the appropriate text of a script segment from the module on designing tutoring materials (Figure 3.3).

Expert Appraisal

Each module was submitted for repeated appraisal by experts. The review panel included:

Mr. Stoner: I'm going to show you many more above things. Watch carefully. Is the pencil above the book now?

Children: Yes.

Mr. Stoner: Is the book above the pencil now?

Children: Yes.

Mr. Stoner: That's good. John, which of the two things should be bigger? Is it the upper thing or the lower thing?

John: The lower thing...No, the upper thing..., No, I guess the lower and upper things can be big.

Mr. Stoner: That's right, John. When you talk about above, you need two things. But the top one can be big, or the bottom one can be big...yes, Ellen?

Ellen: Mr. Stoner, can both things be big?

Mr. Stoner: That's very good, Ellen! In an 'above' sentence both things can be the same size. They can both be big or small...Now watch these three pictures and tell me if 'above' things are always living things...(fade out)

Narrator: Ready for your observation test? Please turn to page 8 for the quiz on Step 4. Turn off the tape while you work on this.

QUIZ ON STEP 4

Given below are four questions based upon your recent observations of Mr. Stoner's classroom. Read each question carefully and check the most

Figure 3.2 Script segment from the module on planning a concept lesson

appropriate answer(s) given below the question. You may choose more than one alternative for each question if necessary.

1. What would you say is the purpose of this step?

   ( ) To provide generalization training so that the learners could identify new examples.

   ( ) To provide discrimination training so that the learners could identify nonexamples.

   ( ) To provide training in both generalization and discrimination.

2. Which of the following could be a specific objective for this step?

   ( ) The learner shall identify the critical attributes in the examples presented.

   ( ) The learner shall identify the variable attributes in the examples presented.

3. What type of examples and nonexamples does the teacher use?

   ( ) Clear-cut examples.

   ( ) Divergent examples.

   ( ) Matched pairs of examples and nonexamples.

4. What are the major teacher activities during this step?

   ( ) Show the examples to the learners.

   ( ) Show the nonexamples to the learners.

   ( ) Ask learners to identify the critical attributes in the examples.

   ( ) Ask learners to identify the variable attributes in the examples.

Please restart the audiotape after completing this quiz.

Figure 3.2 Continued.

82.	"Select a suitable child." (CAPTION) *(REDUNDANT COMBINATION)*	*82/You begin these tryouts by selecting a suitable child. Make sure that this child represents the type of children for whom the tutoring material is designed. ...*
83.	Child doing a math page. Tutor sitting on floor holding flowchart. Angle over tutor's shoulder to show flowchart and child. (LIVE SHOT) *(SUMMATIVE COMBINATION)*	*83/Take him through the materials by following your own flowchart and lesson strategy. As you tutor, watch for various problems. ...*
84.	Child laboriously writing number in box on paper. (LIVE SHOT) *(SUMMATIVE COMBINATION)*	*84/For example, during our tryouts with the addition tutoring aid we originally required the child to write the sum of the two numbers in the box. But this slowed up the tutoring procedure so much that we decided to require only an oral response. There were a couple of other unanticipated problems during the tryouts. ...*
85.	Child looking intently at handful of pennies. (LIVE SHOT) *(SUMMATIVE COMBINATION)*	*85/Originally, we used pennies for our counters, but we found that the*

Figure 3.3 Sample visual storyboard (in verbal form) with accompanying script segment from the module on designing tutoring materials.

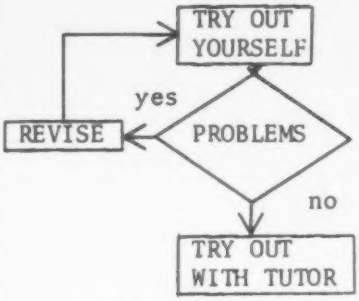
	children were so distracted by them that we had to shift to plain white poker chips. ...
86. Two sets of cards: one with thin medium sized felt pen numbers, the other on larger cards with bold magic marker numbers. (PROP SHOT) *(SUMMATIVE)*	*86/Our original numbers were medium-sized ones written with a felt pen. After the tryout we shifted to larger numbers written with a magic marker. ...*
87. Flowchart:  TRY OUT YOURSELF yes REVISE PROBLEMS no TRY OUT WITH TUTOR (GRAPHIC) *(SUMMATIVE)*	*87/After four or five of these individual tryouts with children and revisions, you should be able to obtain consistent results with your tutoring material. You are now ready for a tryout with an actual tutor.*

Figure 3.3 Continued.

1. Special education faculty members at the Center for Innovation in Teaching the Handicapped, Indiana University.
2. Instructional developers at the Center for Innovation in Teaching the Handicapped and the Instructional Systems Technology Department, Indiana University.
3. A professional editor.

Sample questionnaires given to experts are shown in Figures 3.4 to 3.7.

Revision

Based on feedback from experts, a number of revisions were carried out on each module. The specific revisions that were made are too numerous to list in this report. However, some of the types of revisions which were carried out are given below:

1. The language was simplified.
2. Figures and illustrations were added to some of the response books and to the visual storyboards.
3. Examples were added.
4. Follow-up activities and transfer exercises were increased, particularly in the analyses modules.
5. Rearrangement of information to different components was carried out. In particular, some of the material contained in the visuals or on the audiotape were included in the response books for permanent reference.
6. Trainee activities were altered and made more relevant.
7. The content in some of the modules, particularly the design modules (and especially the Classroom Graphics module), was resequenced.

Checklist: Appropriateness of Instructional Content

Directions

Critically inspect the instructional package and all adjunct materials. Evaluate the appropriateness of the material with respect to the goals and objectives of special education. Rate each item on the basis of 5 points for outstanding quality, 4 points for better than average, 3 points for average, 2 points for below average, and 1 point for unacceptable. Circle the appropriate number to indicate your rating. On the second section of this checklist, please give your suggestions for improving the materials.

1. Relevance of the stated objectives of the material to the general goals of teaching exceptional children. 1 2 3 4 5
2. Meaningfulness of the objectives to the teacher. 1 2 3 4 5
3. Meaningfulness of the objectives to the trainee. 1 2 3 4 5
4. Sources from which the objectives are derived. 1 2 3 4 5
5. Stated rationale for the objectives. 1 2 3 4 5
6. Relevance of the content to the objectives. 1 2 3 4 5
7. Theoretical soundness of the content. 1 2 3 4 5
8. Adequacy of definitions and explanations. 1 2 3 4 5
9. Use of technical terms, formulae, and notations. 1 2 3 4 5
10. Number of examples. 1 2 3 4 5
11. Authenticity of examples. 1 2 3 4 5

Suggestions: ____

____

____

____

____

Figure 3.4 Questionnaire given to content specialists.

Checklist: Effectiveness of Instructional Materials

Directions

Critically inspect the instructional package. Suggest modifications in each of the following aspects for improving the effectiveness of the material.

1. Statement of objectives

2. Response book items

3. Instructional content

4. Level of language

5. Style of presentation

6. Instructional activities

7. Difficulty level

8. Sequence of presentation

9. Practice and review

10. Feedback to trainee

11. Instructor's manual

Figure 3.5 Questionnaire given to special educators.

Checklist: Feasibility of Instructional Materials

Directions

Critically inspect the instructional package. Evaluate the usability of the material in a typical school setting. Rate each item on the basis of 5 points for considerable usability, 4 points for better than average usability, 3 points for average usability, 2 points for below-average usability, and 1 point for virtual unusuability. Circle the appropriate number to indicate your rating.

1. Adequacy of packaging. 1 2 3 4 5
2. Availability of supplementary materials. 1 2 3 4 5
3. Reusability of the materials. 1 2 3 4 5
4. Equipment requirements. 1 2 3 4 5
5. Space requirements. 1 2 3 4 5
6. Preparation time. 1 2 3 4 5
7. Training time. 1 2 3 4 5
8. Scheduling requirements. 1 2 3 4 5
9. Cost. 1 2 3 4 5
10. Instructor's manual. 1 2 3 4 5
11. Procedure for use. 1 2 3 4 5
12. Flexibility of use. 1 2 3 4 5
13. Special skills required for use. 1 2 3 4 5
14. Potential acceptance by teacher trainers. 1 2 3 4 5
15. Potential acceptance by teacher trainees. 1 2 3 4 5

Suggestions for improvement: ____

____

____

____

Figure 3.6 Questionnaire given to teacher trainers.

Checklist: Language Review

Directions

Rate the material on each of the following items by circling the appropriate number in the five-point scale. In addition, edit and rewrite the material as needed.

1.	Poorly organized	1	2	3	4	5	Well organized
2.	Ineffective use of captions	1	2	3	4	5	Effective use of captions
3.	Too long or too short for the topic	1	2	3	4	5	Optimum length for the topic
4.	Confusing	1	2	3	4	5	Clear
5.	Wordy, rambling	1	2	3	4	5	Brief, concise
6.	Awkward	1	2	3	4	5	Fluent
7.	Inefficient organization	1	2	3	4	5	Efficient organization
8.	Technical terms left undefined	1	2	3	4	5	Technical terms defined properly
9.	Too formal or too informal	1	2	3	4	5	Suitable style
10.	Inconsistent	1	2	3	4	5	Consistent
11.	Dialogue stilted	1	2	3	4	5	Dialogue fluent
12.	Too many or too few examples	1	2	3	4	5	Appropriate number of examples
13.	Examples are distracting	1	2	3	4	5	Examples are useful and relevant

Comments: ____

____

Suggestions: ____

____

Figure 3.7 Questionnaire given to language reviewers.

8. Active participation on the part of the trainees was increased.
9. The amount of feedback given to trainees was increased.
10. In serveral of the modules (e.g., Task Analysis) a preview, in terms of a "teaser," was added.
11. The amount of material for certain of the preinstructional competencies was so great that instruction was broken into smaller units. This is the rationale for having two modules for task analysis and two for concept analysis.
12. Irrelevant content and activities were deleted.
13. The difficulty level of some of the learning activities was simplified.
14. Instruction on prerequisite skills and knowledge was added (e.g., In Classroom Charts, a section on various media for producing classroom charts was included).
15. The mechanics for some of the analysis and design skills were simplified.

Production of Prototype

Prototypes of the various modules were produced at the rate of approximately one every two months. Audiorecording was done under the direction of an audio director/engineer. All visuals were shot on 35 mm double frame slides under the supervision of both the instructional developer of a given module and an instructional media specialist. With parental permission handicapped children from the Developmental Training Center, Bloomington, Indiana, were used as child subjects for the modules. Classroom settings, teacher-made materials, assorted artwork, and other properties appearing in the modules were obtained from classrooms where handicapped learners were receiving instruction. The captions for visuals in the prototype modules were typed on cardboard and photographed on Ektachrome tungsten film. The response books were prepared from mimeographed stencils and bound in 8½ x 11" format.

Assembly

When the editing of the audiotape was completed for each module, the tape was subaudibly pulsed for synchronization with the slides. The assembled prototype modules were prepared for further expert appraisal and learner verification.

Formative Evaluation

During the formative evaluation phase, experts and available trainees were exposed to the various modules.

Expert Appraisal. Special education teacher trainers from Indiana University, as well as from 16 other teacher-training institutions throughout the United States reviewed the prototype modules. The same questionnaires as were distributed previously were also given to these experts. In addition, anecdotal data were recorded from the experts and the content of their comments analyzed. Given below is a list of the experts who reviewed the various modules:

Dr. Patricia Morrissey	Indiana University Bloomington, Indiana
Dr. Patricia Gillespie	Indiana University Bloomington, Indiana
Dr. Keith Brownsmith	Indiana University Bloomington, Indiana
Dr. Robert Ankney	Bowling Green State University Bowling Green, Ohio

Dr. Mona Ballard	Valparaiso University Valparaiso, Indiana
Dr. Bruce Baum	State University College at Buffalo Buffalo, New York
Ms. Maria Bove	College of St. Joseph the Provider Rutland, Vermont
Dr. Richardine Connellee	Appalachian State University Boone, North Carolina
Dr. Robert Fowler	University of Florida Gainesville, Florida
Dr. Dorothy Howard	University of Kentucky Lexington, Kentucky
Dr. Sue Kiniry	Texas Tech Lubbock, Texas
Dr. James McLoughlin	University of Kentucky Lexington, Kentucky
Dr. Carl Mangum	Nicholls State University Thibodaux, Louisiana
Dr. Stanton Morris	University of Denver Denver, Colorado
Ms. Dolores Peters	St. Joseph College West Hartford, Connecticut
Dr. Timothy Roberts	Bowling Green University Bowling Green, Ohio
Ms. Carole Stowitschek	George Peabody College for Teachers Nashville, Tennessee
Ms. Mary Thormann	Marymount College Arlington, Virginia

In addition to special education teacher trainers, instructional developers also reviewed the modules. Identical questionnaires were distributed to these experts, less the content questionnaire. Instructional developers participating in these reviews were:

Dr. Allan Sheppard	Fort Valley College Fort Valley, Georgia
Dr. James Russell	Purdue University Lafayette, Indiana
Dr. Dennis Pett	Indiana University Bloomington, Indiana
Dr. Kent Reavis	Southeast Virginia Training Center for Mental Retardation Chesapeake, Virginia
Dr. Gary Morisson	University of Mid-America Lincoln, Nebraska

Finally, production specialists were asked to assess the technical quality of the various components. Faculty and graduate students from the Division of Instructional Systems Technology at Indiana University were requested to appraise the prototype modules. Two complete graduate classes in advanced production techniques also evaluated the prototype modules. The checklists given in Figure 3.8 to 3.10 were distributed to these experts in order to assist them in their appraisals.

Feedback from all experts was used as the basis for revisions to the modules.

Learner Verification. The prototypes of each module were tested with teacher trainees, practicing teachers, itinerant teachers, and consulting teachers in a number of different settings using a variety of delivery systems. The purpose of the tryouts at this stage was to gather information from members of the target population on how to improve the modules. As information was gathered from trainees, revisions were made and the revised versions were retested with new trainees. Figure 3.11 shows the cycle of tryout and revision which was undertaken for each module. When data indicated satisfactory results for a module, final adjustments were made and the module was moved to the final

		Good	Adequate	Unacceptable
1.	Are voices clear?	____	____	____
2.	Can every word be understood?	____	____	____
3.	Are there distracting noises in the narration?	____	____	____
4.	Are there tape noises?	____	____	____
5.	Can subaudible tones be heard?	____	____	____
6.	Are audible tones clear?	____	____	____
7.	Is synchronization correct?	____	____	____
8.	Are there any script errors?	____	____	____
9.	Can edit sounds be heard?	____	____	____
10.	Are voices credible?	____	____	____
11.	Are pauses the right length?	____	____	____
12.	Do record and playback speeds match?	____	____	____
13.	Is music appropriate?	____	____	____
14.	Is music well-integrated?	____	____	____
15.	Is music level balanced with narrator?	____	____	____
16.	Is there sufficient leader?	____	____	____

☐	☐	☐
Rerecord	Modify	Retain

Figure 3.8 Audio checklist.

	Good	Adequate	Unacceptable
1. Is picture in focus?			
2. Is there sufficient depth of focus?			
3. Is exposure correct?			
4. Is the lighting correct?			
5. Is color balance correct? Is color even?			
6. Is the object of importance prominent enough?			
7. Are there distracting elements in the picture?			
8. Are words legible?			
9. Does the picture match the audio track?			
10. Is picture consistent with others?			
11. Is the picture mounted straight?			
12. Is the picture clean?			

☐ Reshoot ☐ Modify ☐ Retain

Figure 3.9 A checklist for visuals.

	Good	Adequate	Unacceptable
1. Organization of the content.	____	____	____
2. Effective use of headings and subheadings.	____	____	____
3. Validity of criterion questions.	____	____	____
4. Adequacy of summaries and checklists.	____	____	____
5. Style of writing.	____	____	____
6. Evidence of proof reading.	____	____	____
7. Ease of reference.	____	____	____
8. Utility of references.	____	____	____
9. Layout and format.	____	____	____
10. Use of visuals.	____	____	____

☐ Retain ☐ Revise ☐ Re-do

Figure 3.10 A checklist for evaluating the response booklet.

Table 3.1

Developmental Testing Stages

Stages	Tryout situation	Type of students	Type of data	Revision
1. Initial testing	Individual teacher trainees or small groups in a face-to-face situation with the instructional developer	Selected teacher trainees	Qualitative. Responses, reactions, and comments from teacher trainees	Some on-the-spot, others after each tryout session
2. Quantitative testing	In actual training situation under the direction of the instructional developer	Teacher trainees enrolled in a course	Written responses. Also responses to questionnaires	Systematic revisions based on data analysis.
3. Total-package testing	In actual training situations without the instructional developer	All teacher trainees enrolled in a course	Responses to tests and questionnaires. Instructor comments and suggestions	Revisions of instructor's manual and adjunct materials

production stage and readied for field testing. Table 3.1 shows the various stages of learner verification and revision undertaken in this project, including the total package testing which is described later in this report. Table 3.2 shows the names of the sites where learner verification was conducted, the type of trainees, the number of trainees, the module that was used, and the type of delivery employed.

Revision

Revision activities were simultaneous with expert appraisal and learner verification of the prototype. As feedback was accumulated for a module, it was analyzed and revisions were prescribed. The production teams carried out the revisions made to each module, but they are far too numerous to list here. Instead, some of the major revisions carried out on each module component during the tryout and revision cycle are listed in Table 3.3.

Final Production

When the modules began eliciting favorable comments and consistent student performance, final production was initiated. The slides were converted to filmstrip. The recording on audiotape was transferred to audiocassette. Synchronization of the audio to the filmstrip was redone and verified. The response book was printed in offset in a convenient 6" x 9" format. Finally, a package to contain all the components of the module was designed and produced. The resulting final versions of all the modules were ready for field evaluation.

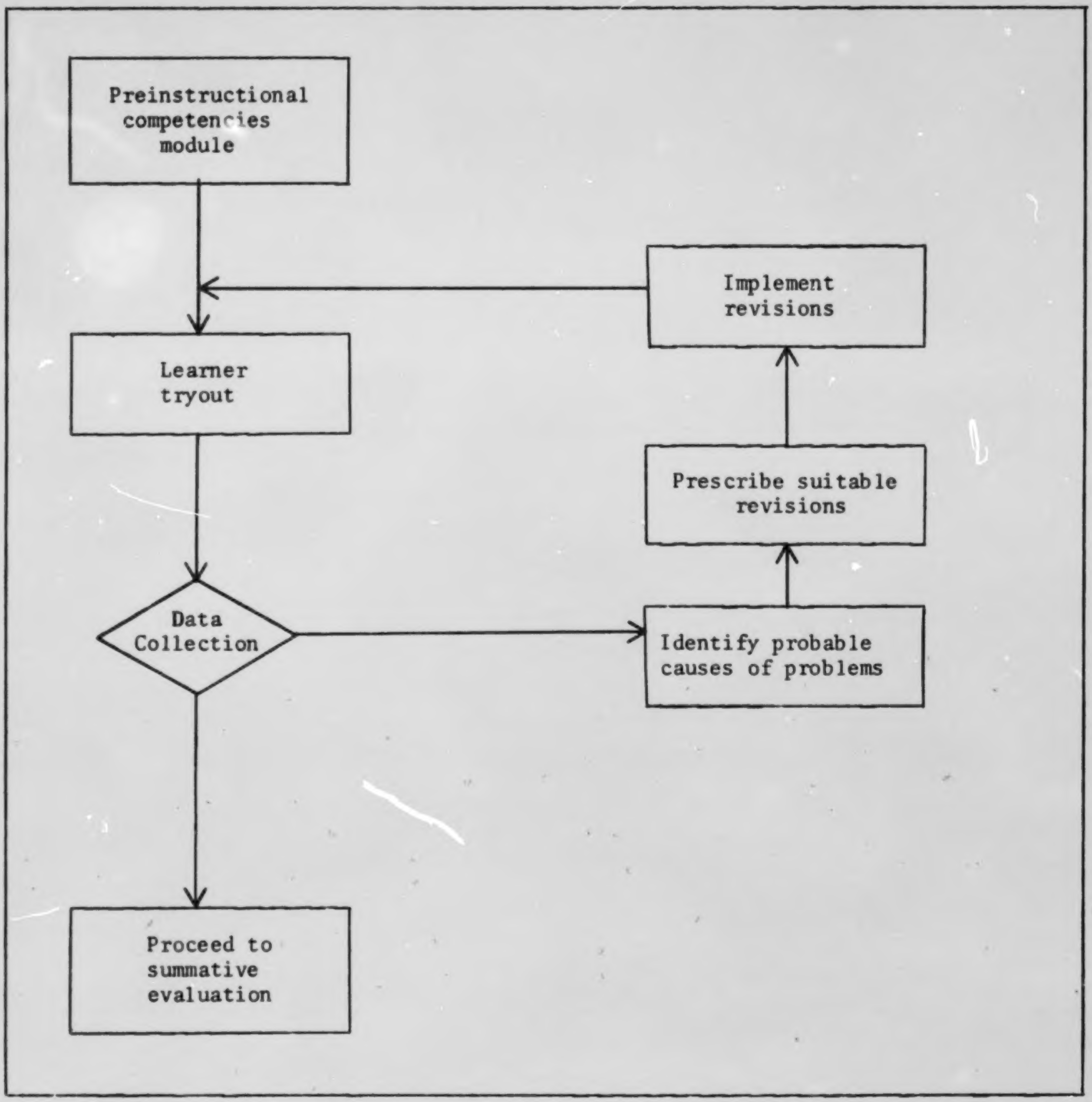

Preinstructional competencies module
Implement revisions
Learner tryout
Prescribe suitable revisions
Data Collection
Identify probable causes of problems
Proceed to summative evaluation

Figure 3.11 Sequence of learner verification and revision activities.

Table 3.2

Learner Verification Sites

SITE	AUDIENCE	N	MODULE USED	TYPE OF DELIVERY
1. Bloomington, Indiana	Undergraduate Special Education teacher trainees	20	Task Analysis	Large group
2. Bloomington, Indiana	Undergraduate Special Education teacher trainees	20	Lesson Planning Through Task Analysis	Large group and individual
3. Walden Woods, Massachusetts	Practicing teachers and consultants in Special Education	17	Instructional Games	Individual and pair
4. Walden Woods, Massachusetts	Practicing teachers and consultants in Special Education	18	Preparing Tutoring Materials	Individual and pair
5. Amherst, Massachusetts	Special Education teachers and L.R.C. workers	6	Concept Analysis	Individual
6. Bloomington, Indiana	Special Education undergraduates	26	Concept Analysis	Large group
7. Bloomington, Indiana	Special Education undergraduates	32	Planning a Concept Lesson	Large group
8. Atlanta, Georgia	Special Education undergraduates	23	Instructional Games	Individual
9. Ashville, North Carolina	Practicing teachers in Special Education	16	Instructional Games	Individual
10. Bloomington, Indiana	Special Education undergraduates	40	Selecting a Curriculum Package	Individual, small group and large group

Table 3.2

Continued

SITE	AUDIENCE	N	MODULE USED	TYPE OF DELIVERY
11. Higgins Lake, Michigan	Itinerant teachers of Special Education	34	Specifying Behavioral Objectives	Large group and small group
12. Gaylord, Michigan	Practicing teachers in Special Education	24	Specifying Behavioral Objectives	Large group and small group
13. Winnepeg, Manitoba	Practicing teachers in Special Education	22	Classroom Charts for Handicapped Children	Large group and pairs
14. Winnepeg, Manitoba	Graduate Students	10	Classroom Charts for Handicapped Children	Individual
15. Thibodaux, Louisiana	Undergraduate and graduate students in Special Education	51	Classroom Graphics for Handicapped Children	Individual
16. Juneau, Alaska	Practicing teachers in Special Education	26	Preparing Tutoring Materials, Instructional Games	Individual, pairs, and small groups
17. Bloomington, Indiana	Undergraduate Special Education teacher trainees	20	Teacher-Made Reading Materials	Individuals

Table 3.3

Major Revisions Made to Each Module During the Formative Evaluation/Revision Cycle

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Task Analysis	1. Series of graded exercises included at the end of the response book.	1. Introductory teaser added.	1. New set of visuals shot for opening teaser sequence.
	2. Sample task analyses changed to more relevant topics for teachers of handicapped children.	2. Consulting teacher's voice changed.	2. All task analyses shot from cards, reshot for greater legibility.
	3. Samples of correctly done task analyses put in right after each question for immediate feedback.	3. Explanation of additional uses for task analysis included.	3. Final visual sequence showing final exercises removed.
		4. Feedback on task analysis exercises removed.	4. Captions redone using vari-type. Color on color captions added.
			5. Task analysis exercises feedback visuals deleted.

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Lesson Planning Through Task Analysis	1. Series of graded exercises included at the end of the response book.	1. Consulting teacher's voice changed.	1. Those close-ups of the plan book which were unclear reshot.
	2. Instructions for exercises rewritten for greater clarity.	2. Longer explanation of specification of objectives added.	2. Shots of children deleted.
	3. Number of practice exercises increased to facilitate transfer of planning skills.	3. Children's voices deleted.	
		4. General audio quality of the tape improved	

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Concept Analysis	1. Number of examples increased from one to three.	1. The introduction revised to a less "offensive" joke.	1. Several errors corrected among examples of squares.
	2. More divergent examples provided (one concept, one common language concept, and one math concept).	2. Narrator changed at the end of each objective to permit a change of pace.	2. Slides showing such examples as a bird above a building and a basketball below the hoop replaced with clearer illustrations.
	3. One of the examples presented in a continuous form instead of in piecemeal fashion.	3. Informative feedback included on some of the student assignments.	3. New introductory sequence reshot.
			4. More slides added to illustrate the concept of matched nonexamples.

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Planning a Concept Lesson	1. Question format for each of the seven steps of the procedure.	1. Pauses between scenes lengthened.	1. Number of captions to emphasize the steps of the procedure increased.
	2. Three review questions added to integrate the entire procedure.	2. Model lesson changed to the dramatic dialogue format from the original narration format.	2. Classroom shots showing the teacher using the seven-step procedure included.
	3. More details for the final transfer assignment specified.		3. The frequency of slide changes near the end reduced.

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Instructional Games for Handicapped Children	1. All activities not related to game modification and adaptation eliminated.	1. An initial segment involving interviews with twelve handicapped children replaced with an interview of their teacher.	1. The introductory interview section entirely reshot.
	2. Details of Shapes rewritten to make adaptation easier for the trainee.	2. Descriptions of twelve modifications of the Shapes game expanded.	2. More visuals added for the Shapes game.
	3. A list of sources of games included.	3. Descriptions of twelve modifications of the Shapes reduced in length.	3. Many teacher shots replaced by photographs of game materials.
		4. Merits of games for handicapped children made in one salient.	4. More close-up shots of game artifacts and children at play included.

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Teacher-Made Reading Materials	1. Section comparing different duplicating procedures added.	1. Initial dialogue introducing the rationale for teacher-made reading materials considerably shortened.	1. All live shots redone to increase clarity.
	2. A basic vocabulary list of 220 words provided for use by teachers.	2. Instructions to stop the tape at the end of each step replaced by two stopping points.	2. Shots with both indoor lighting and sunlight reshot with a 10% magenta filter to increase warmth.
	3. The number of samples of teacher-made stories increased and made more divergent across different age levels.	3. Expository narration of the procedure changed to a dialogue between two teachers.	3. The entire teacher dialogue sequence redone with a more appropriate male model.
		4. Benefits of teacher-made reading materials for handicapped learners more frequently mentioned.	

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Classroom Charts for Handicapped Children	1. The content of the module expanded from experience activity charts to cover all types of classroom charts.	1. The narrator changed because of lack of clarity.	1. A rapid-fire sequence of divergent samples of classroom charts added to the beginning of the module.
	2. More material on the proper use of classroom charts included.	2. The dialogue for the teaser segment entirely eliminated and replaced by music.	2. Examples of classroom charts edited and resequenced to accommodate more diverse media.
	3. An additional transfer exercise included at the end of the response book.	3. The amount of repetition increased to emphasize key concepts.	3. Samples of charts not relevant to the handicapped population eliminated.
	4. The entire seven-step procedure included in the response book.	4. Learner-initiated activity charts given greater importance.	4. The visuals for the seven-step procedure reduced to accommodate response book changes.

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Classroom Graphics for Handicapped Children	1. All exercises not directly related to the competencies specified in the objectives eliminated.	1. More frequent change of narrator made.	1. Increased close-ups of classroom visuals added.
	2. Graphic exercise instructions changed from narrative form to a 1, 2, 3 form.	2. A new narrator selected to sound more like an older, experienced person.	2. Captions reshot using colored backgrounds.
	3. All additional source information on graphics eliminated.	3. Music introduced during the tour of the school segment.	3. Transitional slides incorporated between the various units.

Table 3.3

Continued

MODULE	RESPONSE BOOK	AUDIO	VISUALS
Designing Tutoring Materials	1. Test items dealing with background theory eliminated.	1. All introductory theory eliminated.	1. Backgrounds for tutoraid flowcharts changed to increase contrast and make them more readable.
	2. An exercise which simulated tutoring added to the front before actual design assignments were presented.	2. More frequent exercises inserted in the tape.	2. Full flowcharts and arrows replaced by close-ups of sections of flowcharts.
	3. The number of exam examples of tutoraids increased from one to three.	3. Pauses for trainees to covertly respond to questions lengthened.	3. Actual tutoring materials shown more frequently.
	4. The tutoraid flowcharts redone in heavy black to increase saliency.	4. Relationship of visuals to handicapped learners' needs given increased emphasis on the introduction.	

CHAPTER 4

TOTAL PACKAGE EVALUATION

In this section, the evaluation of the set of preinstructional competencies modules as a total package is described. A rationale for this type of evaluation is given. Following the rationale, the evaluation design is described along with the instruments and materials. This section also contains a detailed description of the evaluative procedure. Finally, results of the total package evaluation are discussed.

Rationale

The decision to conduct a total package evaluation in which all the modules in the preinstructional competencies series were tested was based on the following rationale:

1. The modules were designed as a complete course and therefore should be tested as a complete course. As stated in the original proposal for the project, emphasis in the training of teachers of the handicapped has traditionally stressed the role of the teacher in interactive settings rather than in planning situations. What little training he/she receives in planning and management skills is usually acquired in piecemeal fashion. This series of modules had as its primary design objective the provision of "a systematic approach to training the teacher on the preinstructional competencies..." Evaluation of the effectiveness of this objective requires testing all the modules in a total package setting.

2. The design modules are based on the analysis modules. The first five modules provide the trainee with skills in stating behavioral objectives, performing task and concept analyses, and preparing lesson plans. The design modules require trainees to produce materials for the lessons they have

planned for handicapped learners. These materials should contain specific objectives and be integral parts of systematically derived and planned lessons. Unless the analyses and design modules are all provided to trainees in their proper sequence, the instructional effectiveness of the combination cannot be assessed as a means of providing a complex of skills.

3. A total package evaluation is required in order to measure the attitudinal impact of acquiring all preinstructional competencies. Attitudes toward individual preinstructional competencies may vary with the previous skills that the subjects possess and the appeal of a particular type of analysis or design. Teachers, however, require a number of skills in order to adequately prepare lessons and materials for their handicapped pupils. It is not a favorable or unfavorable attitude toward one skill that determines whether a teacher will employ a systematic approach to his/her teaching. It is an attitude to the entire range of competencies required before instruction actually takes place. Assessment of this total attitude can only be carried out when trainees are exposed to the complete series of modules.

4. A total package evaluation is required in order to measure attainment of a total set of preinstructional competencies. Just as with attitudes, attainment of one or two preinstructional competencies does not guarantee that trainees have acquired a sufficient set of competencies for systematic planning of their instruction. By providing trainees with the entire series of modules and assessing their total competencies, more information is made available for determining the interrelationships among competencies.

5. Accumulating data on all the modules enables us to make comparisons among them. Individual modules are bound to have differential effects in terms of competency acquisition, attitudinal impact and appeal. By presenting the

same group of subjects with all the modules in the series, we are able to make comparisons among the modules on a wide range of variables. This provides us with a base for determining causes of variability of effects among the different modules.

6. Data analysis is simplified through a total package evaluation. A few of the major problems in any evaluation of data are; keeping track of the data, assuring comparability of effects, and determining the homogeneity of subject groups. By employing fixed groups of subjects for all modules, analysis of the effects of the individual modules is simplified. This increases the efficiency of data collection.

7. Earlier evaluations of individual modules indicated a desire on the part of both trainees and trainers for a more coherent instruction as opposed to "one-shot" deals. In testing individual modules under field conditions, a recurrent theme in follow-up discussions with both trainers and trainees was the lack of closure in working through a single module. The implication was that this form of working through a module was too "piecemeal." It was suggested that modules which are coherently related to each other should be tested together in a situation where working through the modules was integrated into a meaningful program.

8. Through repeated use of the audio-visual training module, the novelty effect of this format is reduced. Time and again, a true reading of the effects of an innovative system is distorted by the novelty effect of the system. Virtually all special education courses, other than the practicum variety, involve **the traditional** lecture and textbook. Bringing an audio-visual training module into such a setting can be extremely reactive. However, in a course which entirely consists of an individualized audio-visual format

spread out over a semester, the novelty effect soon wears out. This permits the assessment of the effectiveness of the modules apart from their novelty.

9. Through repeated use of the audio-visual training modules, the fatigue effect of this self-instructional format can be assessed. Just as novelty can distort the effects of a self-instructional audio-visual training module, so too can the fatigue effect influence results. As more and more special education teacher-training programs go to competency-based and individualized instruction, greater demands for self-instructional modules are made. Can a pre-service or inservice teacher take an entire course which is self-instructional in nature? Through a total package testing, this question can be answered.

10. Previous evaluations of modules produced by the Center for Innovation in Teaching the Handicapped (CITH) have always been done on individual modules. In previously funded projects, CITH has carried out systematic evaluation of either individual modules or pairs of modules to evaluate the effectiveness on a number of criteria. Total package evaluation can add relevant information on the cumulative effects of a number of modules and the viability of such an approach to evaluation.

11. A total package evaluation provides useful information for novice instructors who are seeking to implement the series. Many of the preinstructional competencies contain concepts and principles that are unfamiliar to special education teacher trainers who nevertheless regard these analytic and planning skills as essential for the modern teacher of the handicapped. Those who are interested in utilizing the series of modules as the basis for a course require data on the total effect.

12. A total package evaluation is cost-effective. Where a number of instructional materials are designed and require field testing, the cost of identifying and establishing numerous sites, as well as preparing instructors for evaluation through visits and telephone communications, becomes extremely high. By evaluating the modules in a real course setting where all the modules in the series are tested at the same site, cost savings accrue without loss of useful and usable data for a summative evaluation.

13. Enthusiastic urgings from the field to test the entire series and a number of offers to "run a course" based on the module series indicated a need to conduct a total package evaluation. Teacher trainers in special education as well as consulting teachers, and other special educators who visited the center and learned of the series of modules on preinstructional competencies, demonstrated eagerness to try out the entire package. More than twenty unsollicited requests encouraged the Center to take this approach.

To summarize, a number of factors recommended total-package testing as the most appropriate approach to the summative evaluation of the series of modules. In the initial proposal, the general objective for the project was stated thus:

> Upon completion of the entire program, the teacher shall be able to demonstrate the following competencies:
>
> Task analysis. Identify units and lessons and analyze them into component tasks and concepts to be acquired by the handicapped child.
>
> Specification of objectives. State and sequence a set of behavioral objectives for an individual child.
>
> Designing instructional materials. Design learning games, programmed units, transparencies, etc. to supplement existing materials.

Lesson planning. Plan for the systematic integration of behavioral objectives, criterion-test items, instructional materials, and interactive strategies.

Designing learning environments. Plan and design appropriate environments to enhance desired learning outcomes.

To evaluate whether trainees acquire all these competencies as initially proposed, a total package evaluation was undertaken as the final activity of the project.

Design

In order to carry out a total package evaluation that would have meaning to consumers of the modules, the evaluation team decided to carry out their final testing of the modules under actual field conditions. A complete "hands-off" evaluation procedure was designed in order to eliminate the contaminating presence of the Center staff.

Performance

Because of the specialized nature of the content of the modules, the evaluators decided not to administer any performance pretests. This decision was based on discussions held with instructors from special education teacher-training programs who indicated that questions related to such topics as task analysis, concept analysis, or classroom charts would be meaningless to their students. To confirm this, during formative evaluation, several pretests on randomly chosen modules from the preinstructional series were administered to undergraduate students enrolled in special education courses. Low results plus extremely negative reactions to questions asking, for example, that a trainee specify close-in nonexamples of a concept in which the most salient critical attribute was missing, or make the optimal choice between grid and non-grid scaling, confirmed the evaluators' decision not to collect pretest data. Hence, the design basically involved a posttest-only paradigm with a criterion-referenced posttest designed to directly measure the attainment of the objectives for each module. No control groups were employed. In terms of the performance evaluation, the design can be illustrated thus:

$$X_1 \ldots . O_1 \ldots . X_2 \ldots . O_2 \ldots . X_n \ldots . O_n$$

---

where X is the modular treatment and O is the criterion-referenced posttest immediately following the use of the module.

Attitude

Two major attitudinal variables were involved in this total package evaluation:

1. Attitude toward the content of each module.
2. Attitude toward the self-instructional format.

The evaluators decided to collect pretest data on subjects' attitudes toward the content of each module because they considered that, although trainees might not be able to demonstrate any of the preinstructional competencies specified in the modules, they might still have either heard or read about them in classes. They were also concerned with discovering whether the modules had any negative effects in alienating trainees by what might appear to be complex or unnecessary competencies. Finally, they also wished to investigate whether more negative attitudes developed as the novelty effect wore off and the fatigue effect set in.

The design called for the collection of pretest data on attitudes toward the content of each module and toward self-instruction prior to discussion of any of the topics or the use of the series. On completion of the entire set of modules, attitude posttests were administered.

Instruments

A series of performance tests and attitude scales were prepared to determine the extent of acquisition of competencies and of changes in attitudes of the subjects as a result of working through the modules. These instruments consisted of applied performance tests and attitude scales. In addition, instructor comments as an "expert" appraisal mechanism were also collected.

Applied performance tests. For each module, an applied performance test was designed to directly measure the attainment of the main objective. On the basis of a systematic task analysis of the topic, objectives for each module were derived to match each of the main objectives. Domain-referenced items were constructed. These items formed the basis of the applied performance test. Each performance test item was built into the response book of each module. The item required the synthesis and application of all the component competencies treated in the module. In each case, the trainee was required to select a curricular topic of his/her own choice and apply those skills he/she had just acquired as a result of working through the module. A systematic scoring key was designed for each applied performance test to measure outcomes in terms of the minimal standards specified in the training objectives for the module.

In order to facilitate scoring and also provide meaningful feedback to the subjects, a five-point scale was utilized by the instructor on each of the product characteristics contained in the scoring key. The performance test was used in the context of a mastery-learning format. As far as the subjects were concerned, they could improve their scores by redoing the performance test tasks and resubmitting their products for a second rating. The entire set of performance tests are included in Chapter 5.

Attitude scales. To measure the attitudes of subjects toward the content of each module and toward the self-instructional format, a set of 17 bi-polar terms were derived from previous field tests on individual modules (Braffet, 1976; Stolovitch, 1975; Thiagarajan, Semmel & Semmel, 1974). These 17 terms were used as the standard set of items on all of the attitude scales. This particular format was chosen by the evaluation team because of its ease of administration and scoring as well as its relative non-reactivity. Considering the length of each treatment (e.g., the module on Classroom Graphics for the Handicapped along with the performance exercises requires from 2½ to 4 hours), it was deemed critical that instruments be as brief as possible so as not to overload the subject. The same bi-polar terms were preserved in all the attitude scales because previous studies on widely divergent individual modules had demonstrated their reliability. The use of a constant set of terms also permitted comparisons to be made among all modules and facilitated pinpointing common positive and negative attitudinal features across modules. These terms also made it easier for the subjects to respond reliably and consistently. The 17 bi-polar items are shown in Figure 4.1.

Instructor comments. As an unobtrusive and informal measure of the usability and feasibility of the total package, instructor comments and complaints were recorded. Instructors were provided with a toll-free telephone number and asked to communicate with the evaluators any time a crisis arose.

FIELD SITE: ______________________

MODULE: ______________________

PRE-TEST MEDIAN: ________ *POST-TEST MEDIAN:* _ _ _ _

	1	2	3	4	5	
UNPLEASANT						PLEASANT
USELESS						USEFUL
DULL						STIMULATING
WEAK						POWERFUL
INEFFECTIVE						EFFECTIVE
UNCLEAR						CLEAR
IRRELEVANT						RELEVANT
IDEALISTIC						PRACTICAL
NOT PERSONALLY HELPFUL						PERSONALLY HELPFUL
INAPPROPRIATE						APPROPRIATE
NOT BENEFICIAL						BENEFICIAL
TRADITIONAL						NOVEL
UNIMPORTANT						IMPORTANT
BORING						INTERESTING
INEFFICIENT						EFFICIENT
COSTLY						INEXPENSIVE
VALUELESS						VALUABLE

Fig. 4.1. Attitude scales.

In addition, instructors were requested to record their observations of any of the weaknesses of any modules.

Materials

All subjects were required to work through the following materials:

1. Nine audio-visual training modules consisting of an audiocassette, a filmstrip and a response book on the following topics:

Concept Analysis
Planning a Concept Lesson
Task Analysis
Lesson Planning Through Task Analysis
Instructional Games for Handicapped Children
Teacher-Made Reading Materials for the Handicapped
Classroom Charts for Handicapped Children
Classroom Graphics for Handicapped Children
Designing Tutoring Materials

2. One interactive package on specifying behavioral objectives with a series of participatory group assignments. Subjects also were provided with:

a. Singer Graflex Auto-Vance II audio-visual machines with automatic synchronization.

b. Two copies of each of the modules response books (one to be turned in and the other to be retained by the subject).

Procedure

Based on the total package evaluation design, the following procedure was instituted:

1. From a pool of twenty-three offers from various special education teacher-training institutions, two sites were selected to represent typical training programs for teaching of the handicapped. The two chosen sites were The College of St. Joseph the Provider, Rutland, Vermont, and Nicholls State University, Thibodaux, Louisiana. St. Joseph the Provider has a strong commitment to competency-based teacher training and was searching for materials and modules for their special education program. Nicholls State University has only recently become aware of the competency-based movement and was uncertain about using mediated instructional modules as means of providing the core of a course to their trainees. Whereas St. Joseph represented institutions actively concerned with developing a preinstructional competencies course using the audio-visual module series, Nicholls State represented those institutions which were curious, but still tentative.

2. One special education faculty member from each of the institutions came to the Center for Innovation in Teaching the Handicapped. There, they underwent three days of intensive training on the procedures for the total package evaluation. These three days were designed not only to familiarize the instructors with the modules and the evaluation design, but also to elicit from them many of the details for actually carrying out the evaluation at their respective sites. Hence, the three-day session was devoted both to training of the instructors and also collaboratively planning with the evaluators as to how the evaluation of the total package would proceed. Here in brief is how the three days were structured:

a. The instructors familiarized themselves with the modules by working through all of them.

b. Instructors obtained clarification of the content of the modules whenever necessary.

c. Instructors provided formative suggestions for improving the modules.

d. Evaluators and the instructors collaboratively drew up a specific plan for conducting the evaluation. This plan contained specifications for collecting data, handing out materials, sequencing the modules, providing feedback, communicating, grading of students, and coding tests and scales.

e. Instructors participated with evaluators in collaboratively designing the testing instruments.

f. Evaluators and instructors collaboratively drew up a time line and set of procedures for implementing the plan with trainees.

3. The instructors returned to their institutions and organized the courses. This involved:

a. Obtaining departmental approval to run the courses. The two instructors conducted demonstrations of the modules at departmental meetings.

b. Explaining to colleagues what the course contained and how it would be run. The primary purpose for this was to gain cooperation of faculty members as well as to elicit support for enrolling students in the course.

c. Setting up the physical arrangements for running the course. This included obtaining space to set up the audio-visual machines, storage space for securing the modules and equipment, and a work area for students to complete exercises and tests.

4. All the modules and machines were packaged and distributed to the field sites.

5. Actual implementation of the modules was initiated at each site.

a. Attitude scales were administered to all the enrolled students. There was an attitude scale on each module and an additional one on self-instructional materials.

b. Instructors informed students that the course was entirely based on the preinstructional competencies modules. An outline of the course was given, and the procedures and the grading system was described.

c. The interactive package on Specifying Behavioral Objectives was introduced. Subjects played the behavioral objectives games.

d. Subjects took the performance tests.

e. Subjects turned in their performance tests for grading and feedback.

f. Each of the subjects:

i. worked through the first module making responses directly in the response books.

ii. took the performance tests incorporated in the response books.

iii. turned in the performance tests for grading and feedback.

iv. received feedback from the instructor and either made revisions or went on to the next module. Subjects received a fresh personal copy of the response book which they could retain permanently after turning in their used copy.

v. repeated the cycle with a new module until all nine modules were completed.

Figure 4.2 graphically illustrates the procedure subjects followed during the total package evaluation.

6. Instructors processed the data obtained from the applied performance tests. This entailed:

a. Rating the final product from the applied performance test using the appropriate scoring keys.

b. Recording the ratings and sending these on to the evaluators at CITH.

c. Giving feedback to the subjects so that they could either go on to the next module or make revisions on the final product resulting from the applied performance test.

7. Instructors administered posttest attitude scales and coded these.

8. Instructors mailed all attitude scales, performance tests and their own comments to CITH.

9. Evaluators at CITH coded and analyzed the data.

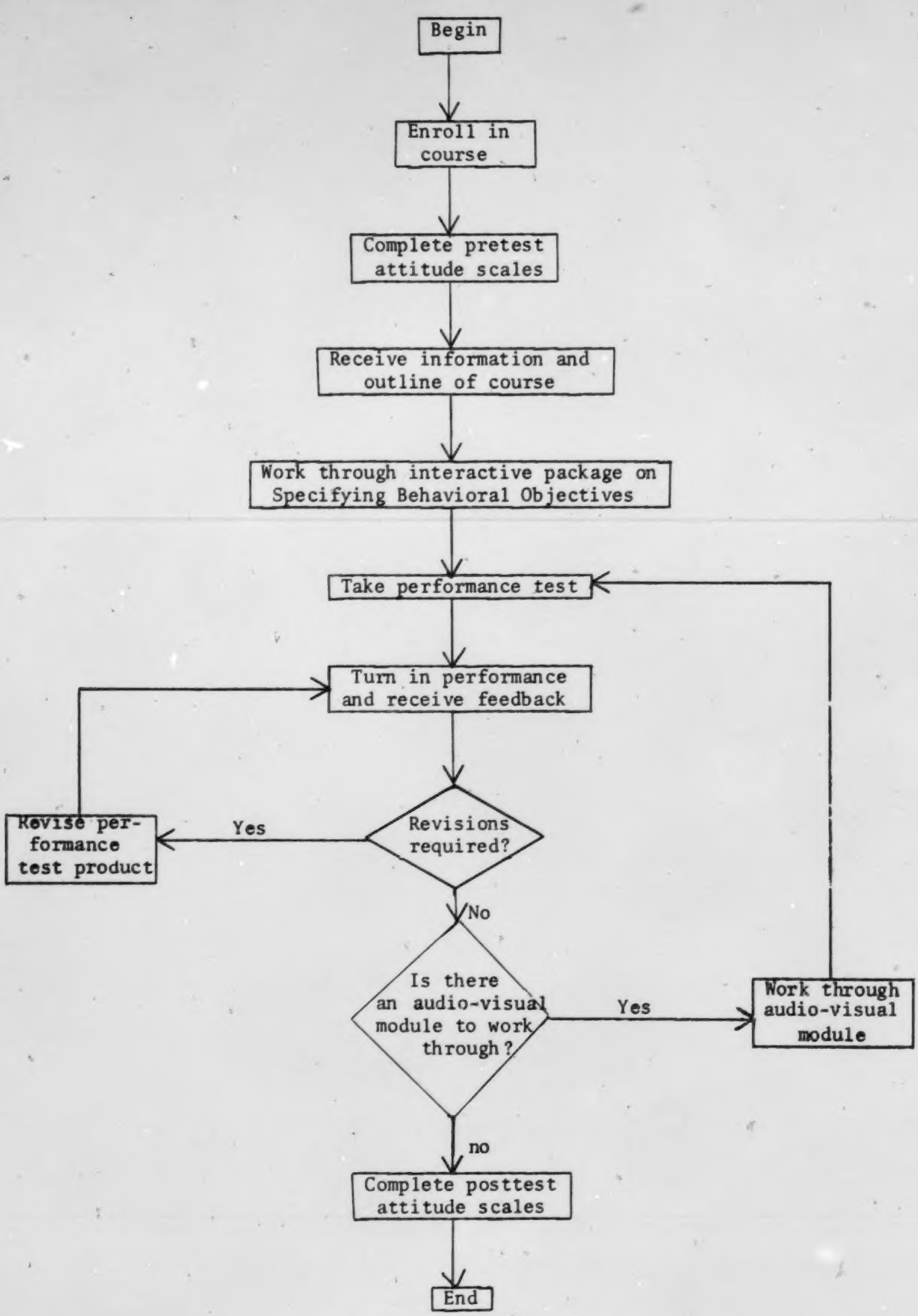

Begin
Enroll in course
Complete pretest attitude scales
Receive information and outline of course
Work through interactive package on Specifying Behavioral Objectives
Take performance test
Turn in performance and receive feedback
Revisions required?
Yes
Revise performance test product
No
Is there an audio-visual module to work through?
Yes
Work through audio-visual module
no
Complete posttest attitude scales
End

Figure 4.2 Procedure for subjects during total package evaluation.

CHAPTER 5

RESULTS

In this section, results of the total-package evaluation are presented and discussed. In general, there are three major categories of results related to this evaluation:

1. Trainees' attainment of preinstructional competencies as measured by applied performance tests based on the objectives for each module.
2. Changes in trainees' attitudes toward the content of the individual modules as measured by semantic differential scales.
3. Changes in trainees' attitudes toward the self-instructional format of the modules as measured by a semantic differential scale.

Each of these categories of results are presented and discussed below:

Gains in Preinstructional Competencies. Immediately after completing each module in the preinstructional competencies series, the teacher trainee was given an applied performance test requiring a transfer of the competencies taught in the module. The requirements of these performance tests are indicated in Figure 5.1. Each performance test required the production of some concrete product which was then evaluated by the instructor of the course with the help of a checklist. The applied performance test was not a timed test; trainees were permitted to spend as much time as they wanted on each project, within the constraints of the course schedule. Some of the later modules required the trainee to design, evaluate and modify fairly elaborate instructional materials; these activities reportedly required as much as eight hours.

The checklists for evaluating each performance test contained a number of appropriate criteria arranged in the form of five-point scales.

MODULE	APPLIED PERFORMANCE TEST
1. Concept analysis	Choose a concept and report the results of a complete analysis in terms of critical and variable attributes, divergent examples, and matched nonexamples.
2. Task analysis	Choose an instructional task and report the results of a complete analysis in terms of a hierarchy of necessary and sufficient subtasks.
3. Planning a concept lesson	Prepare a lesson plan on the basis of the concept analysis and indicate the sequence of teacher behaviors, student responses, examples and nonexamples to be used, and evaluation plans.
4. Lesson planning through task analysis	Prepare a lesson plan on the basis of the task analysis and indicate the sequence of objectives, teacher and pupil activities, suitable instructional materials and evaluation plans.
5. Designing tutoring materials	Design, evaluate and revise a complete kit of tutoring materials on a topic of your own choice.
6. Teacher-made reading materials	Design, evaluate and revise teacher-made reading materials at three different reading levels.
7. Classroom graphics	Design a classroom poster for use with handicapped children.
8. Classroom charts	Design a classroom chart for use in a lesson of your own choice.
9. Instructional games	Adapt a given game to teach a new instructional objective to handicapped children.

Fig. 5.1 Applied performance tests for different modules in the total package evaluation.

The mean score for each test is the mean of the trainees' scores on these five-point scales. The mean and standard deviations for trainee performance, as well as the combined means, on each of the nine applied performance tests are given in Table 5.1 for teacher trainees in Rutland, Vermont, and Thibodaux, Louisiana, field sites. The ratings are criterion-based and may be roughly translated to indicate the following levels of performance:

1 -- adequate
2 -- acceptable
3 -- fair
4 -- good
5 -- exceptional

The combined-means column of the table reveals that the majority of the modules have resulted in _good_ performance while two modules produced _fair_ performances. The range of the mean scores is between 3.8 and 4.4.

Results from the Rutland, Vermont, field site indicate consistently _good_ to _excellent_ performances. The range of mean scores is homogeneous between 4.68 to 4.97. Results from the Thibodaux, Louisiana, field site are, however, in contrast to these results. Teacher trainees in this field site performed only at _acceptable_ to _fair_ levels. The mean scores on different modules range fairly widely from a 2.00 for _Designing Tutoring Materials_ to 3.19 for _Classroom Graphics for Handicapped Children_.

In general, results from the applied performance tests indicate that the mean performances of teacher trainees are acceptable at the least. However, there is fairly striking evidence that the modules have produced different outcomes in different field sites and are not as consistent as earlier formative evaluations and individual tests seemed to indicate. The

Table 5 Results from the Applied Performance Test

MODULE	Combined		Rutland		Thibodaux	
	M	SD	M	SD	M	SD
Concept Analysis	4.155	1.130	4.831	.447	2.667	.617
Task Analysis	3.940	1.361	4.758	.614	2.353	.931
Planning a Concept Lesson	4.106	1.275	4.861	.340	2.639	1.134
Lesson Planning Through Task Analysis	3.796	1.379	4.758	.614	2.286	.717
Designing Tutoring Materials	4.114	1.401	4.906	.296	2.000	.853
Teacher-Made Reading Materials for the Handicapped	4.366	1.113	4.906	.296	2.444	.726
Classroom Graphics for Handicapped Children	4.336	.945	4.788	.415	3.189	.950
Classroom Charts for Handicapped Children	4.039	1.229	4.675	.451	2.130	.707
Instructional Games for Handicapped Children	4.080	1.307	4.970	.174	2.353	.606

major discrepancy between the two field sites may be attributed to one or both of the following causes:

1. Instructor variable. Although both instructors were equally enthusiastic and competent, it is possible that their standards of evaluation differed considerably. Although the evaluation checklists were criterion-based, there was some obvious subjectivity in allocating a suitable number in the various five-point scales. There is some indication from our inspection of the student products and instructor evaluations that while there is a high degree of internal consistency within the evaluations of each instructor, there is some lack of inter-rater reliability. In general, the instructor at Thibodaux, Louisiana, had more stringent criteria for her ratings. The instructor at Rutland, Vermont, had a slightly "lower" standard, and these standards were consistent with those used in our earlier field tests of individual modules.

2. Trainee variables. Although both field sites represented small-sized rural teacher-training programs in special education, it is possible that the types of trainees enrolled in the two different courses differed considerably. Data collected in our telephone conversations with the two instructors did suggest this possibility. Trainees enrolled in the Thibodaux, Louisiana, course were older inservice teachers working for required credits in the evenings. They were unenthusiastic about the course in general and toward the competencies in particular. It is likely that this lack of enthusiasm could have contributed to the lower mean scores in this field site.

In spite of these plausible explanations, the fact remains that in at least one field site, the materials failed to produce results consistent with earlier findings during formative evaluation and during the individual module tests. This suggests the need for a careful analysis of the characteristics of the trainees in the Thibodaux site and the utilization procedure in order to improve the instructional and motivational effectiveness of the course and the inter-rater reliability of the applied performance tests.

The differences between the two field sites become even more salient when the data is presented in the form of percentage charts. Comparative percentage charts which indicate the percent of teacher trainees scoring above a specific level in the five-point scale are given in Figures 5.2 to 5.10.

Changes in Attitudes Toward Preinstructional Competencies. All teacher trainees were pretested on their attitudes toward the competencies related to each module before and after the total package testing through the use of a standardized semantic differential scale containing 17 bi-polar adjectives. Results from these attitude measurements are provided in nine individual charts (Figures 5.11 to 5.19) on the following pages for the combined field sites. The discrepancy between the two field sites does not appear to be as great in this case as it was in the case of the results from the applied performance tests. An analysis of the charts reporting the combined results does not reveal any clear-cut patterns. However, the following tentative conclusions may be reached:

1. In general, teacher trainees appeared to have a fairly positive attitude towards the competencies dealt with the individual modules. No module received a rating below the 3 in any of the five-point items. Most of the ratings clustered between 4 and 5.

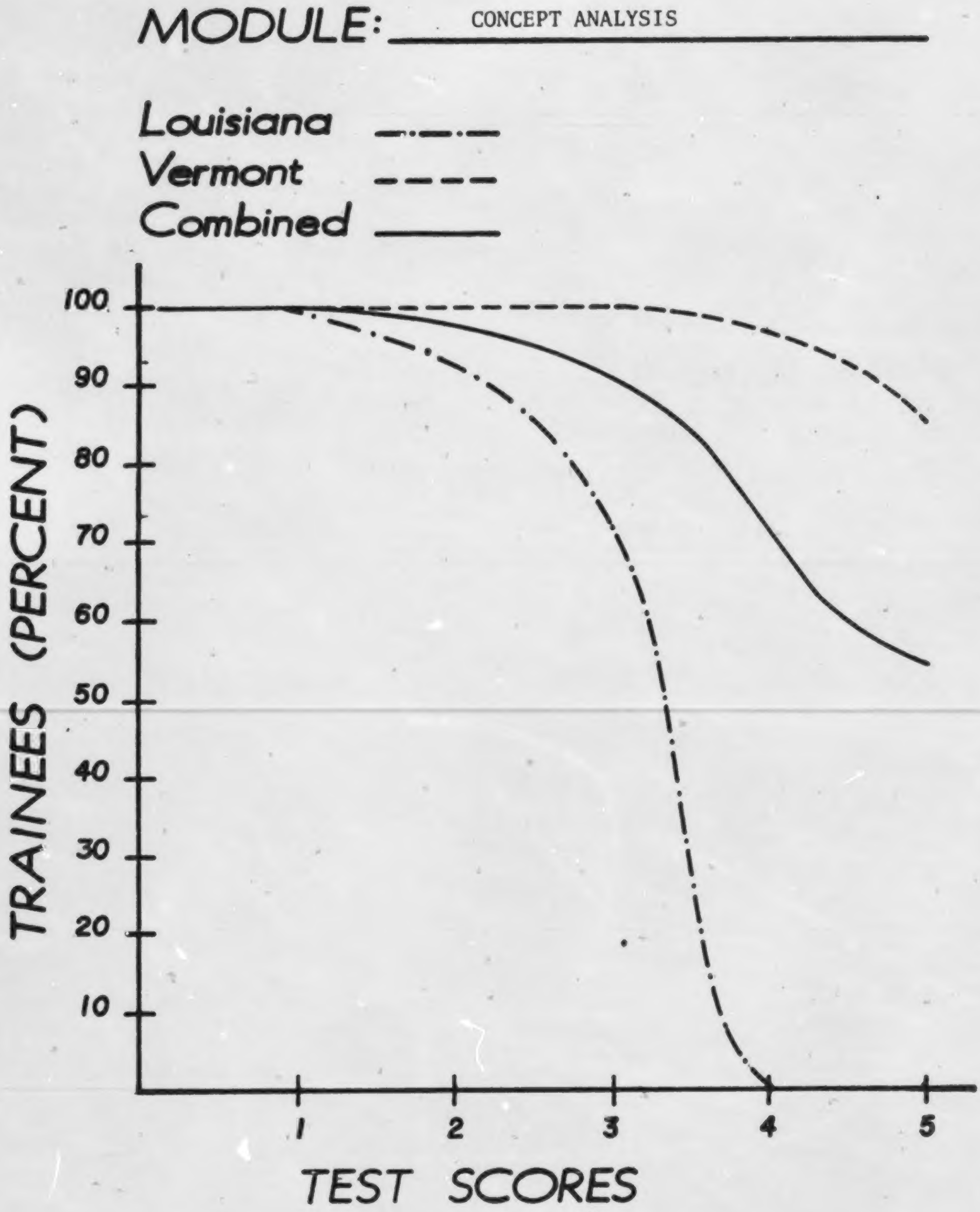


Figure 5.2 Comparative Percentage Chart

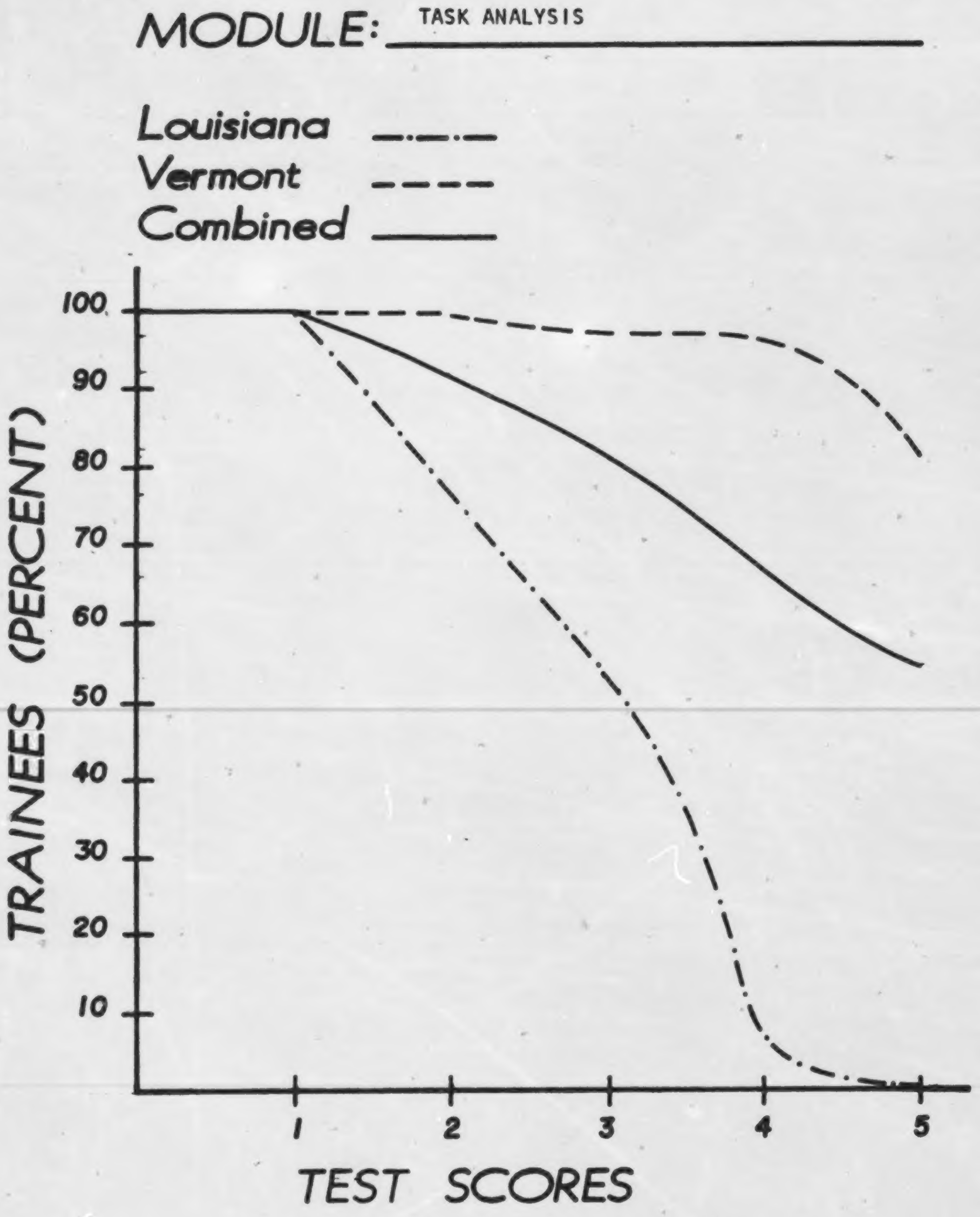


Figure 5.3 Comparative Percentage Chart

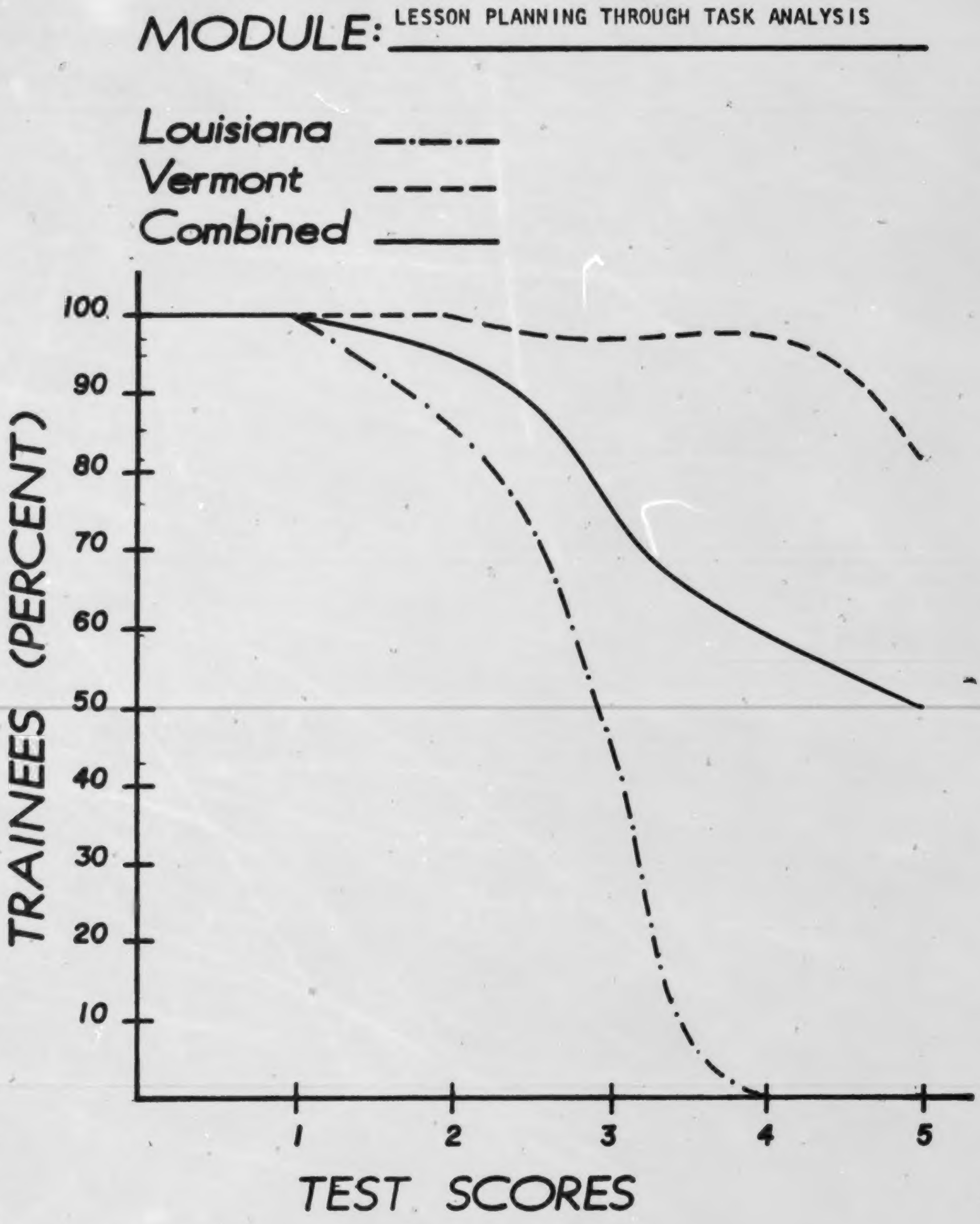


Figure 5.4 Comparative Percentage Chart

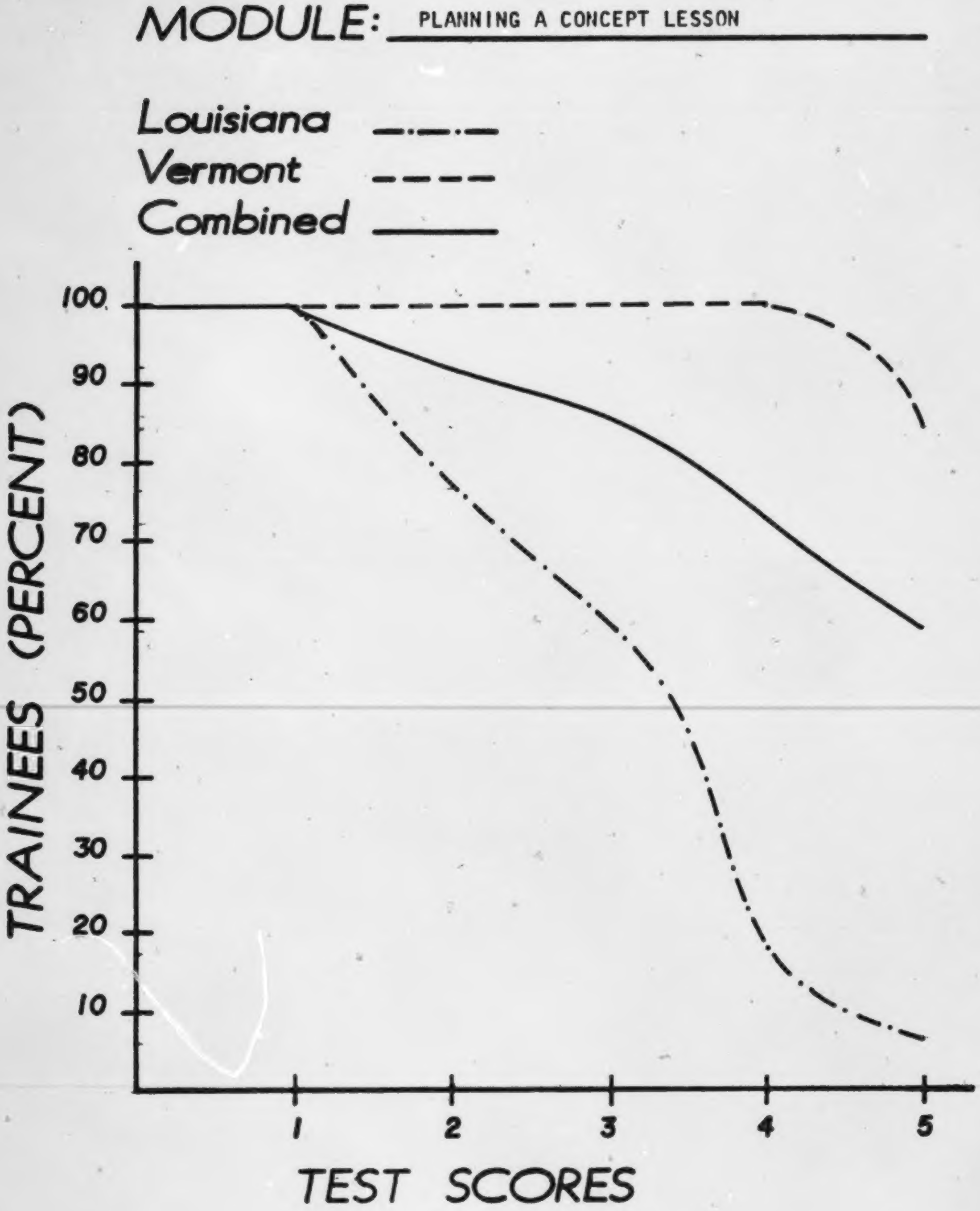


Figure 5.5 Comparative Percentage Chart

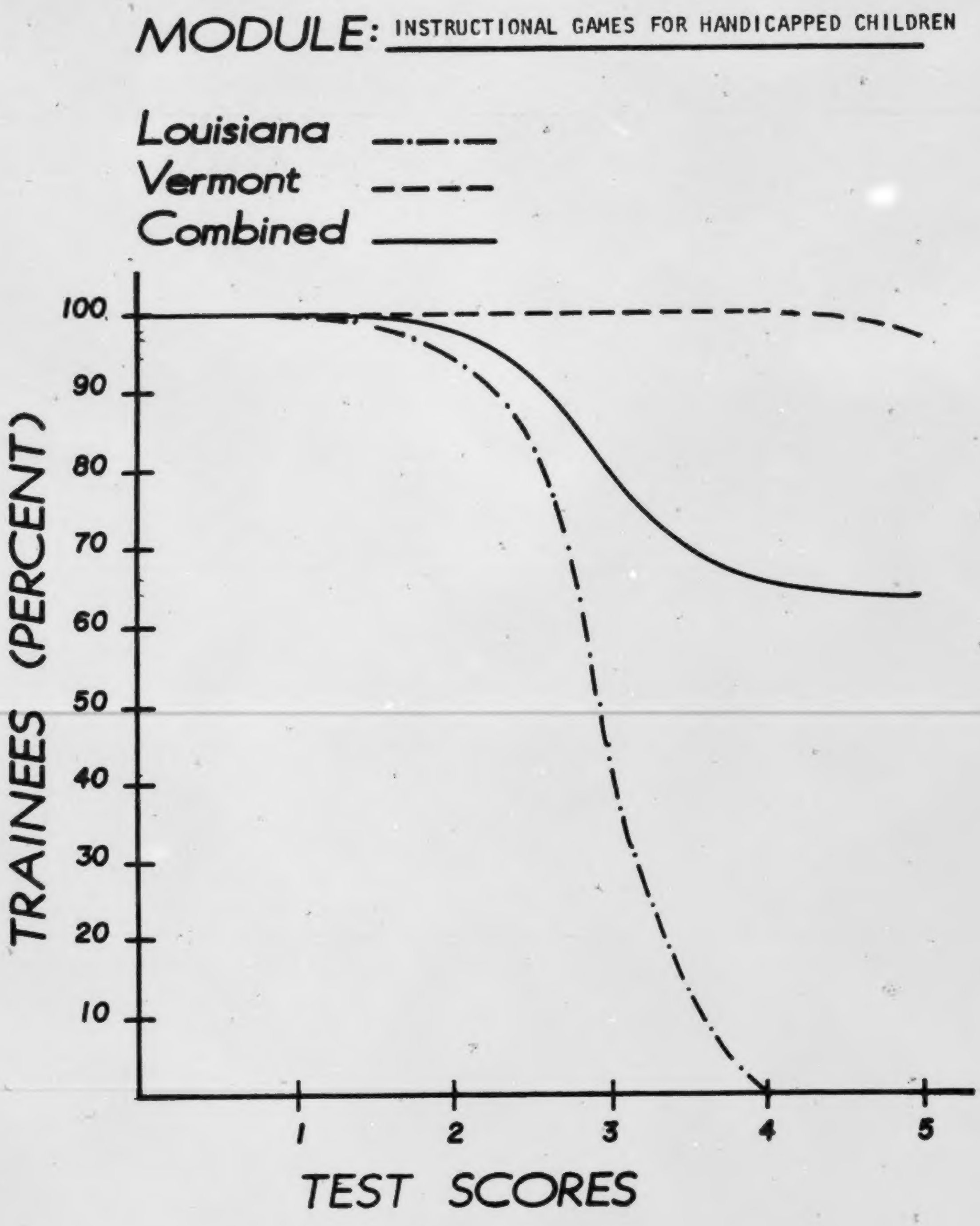


Figure 5.6 Comparative Percentage Chart

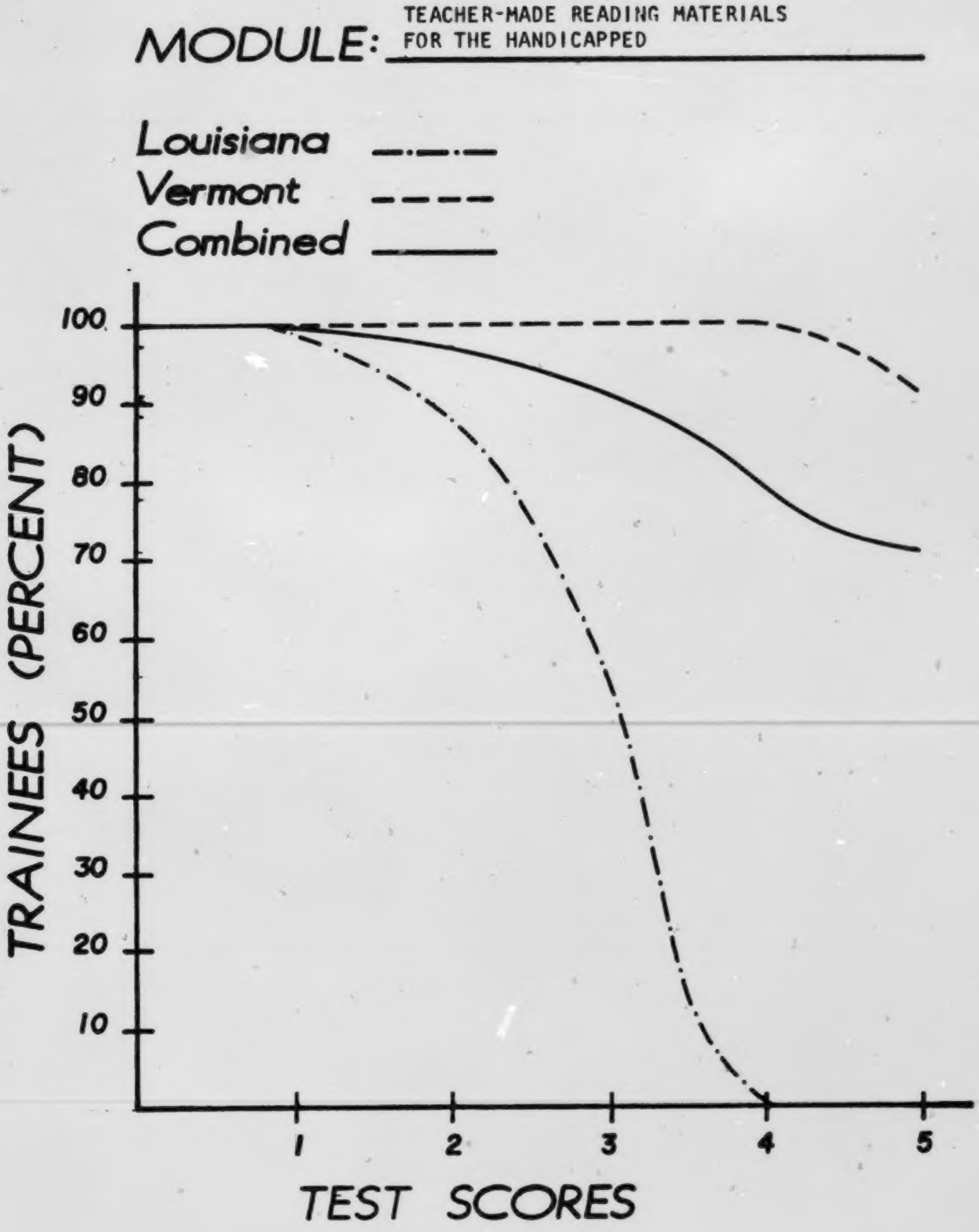


Figure 5.7 Comparative Percentage Chart

MODULE: CLASSROOM CHARTS FOR HANDICAPPED CHILDREN

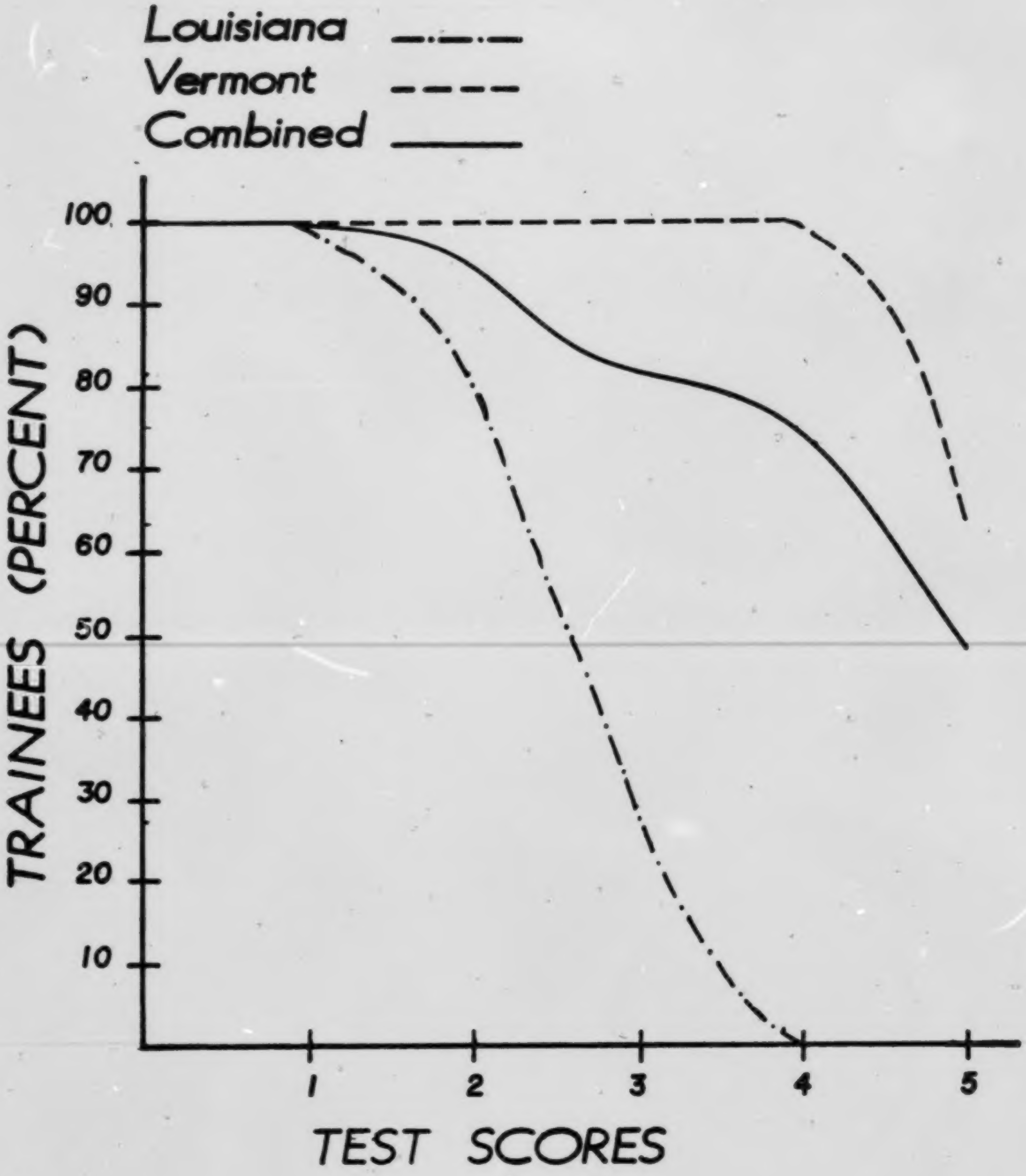


Figure 5.8 Comparative Percentage Chart

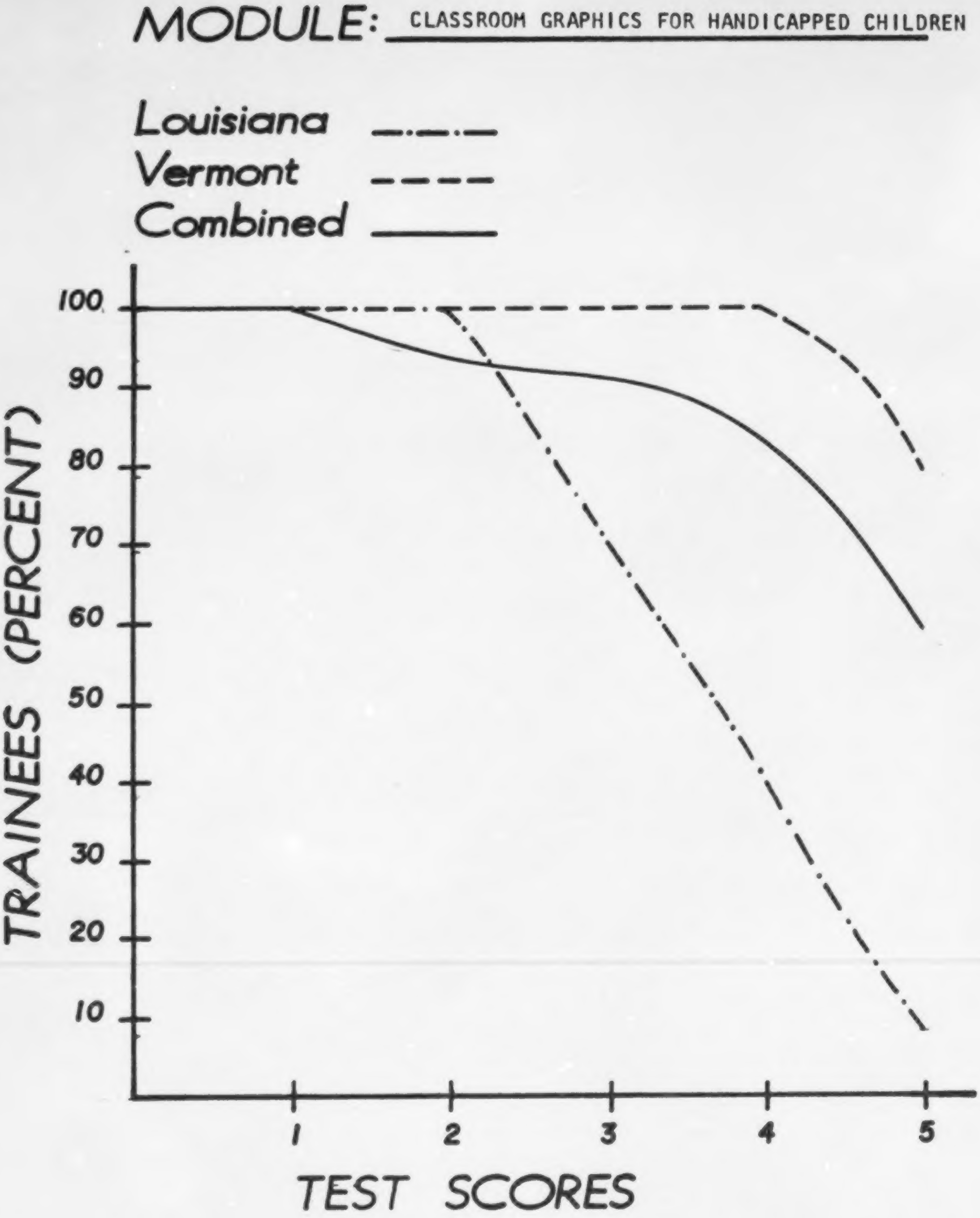


Figure 5.9 Comparative Percentage Chart

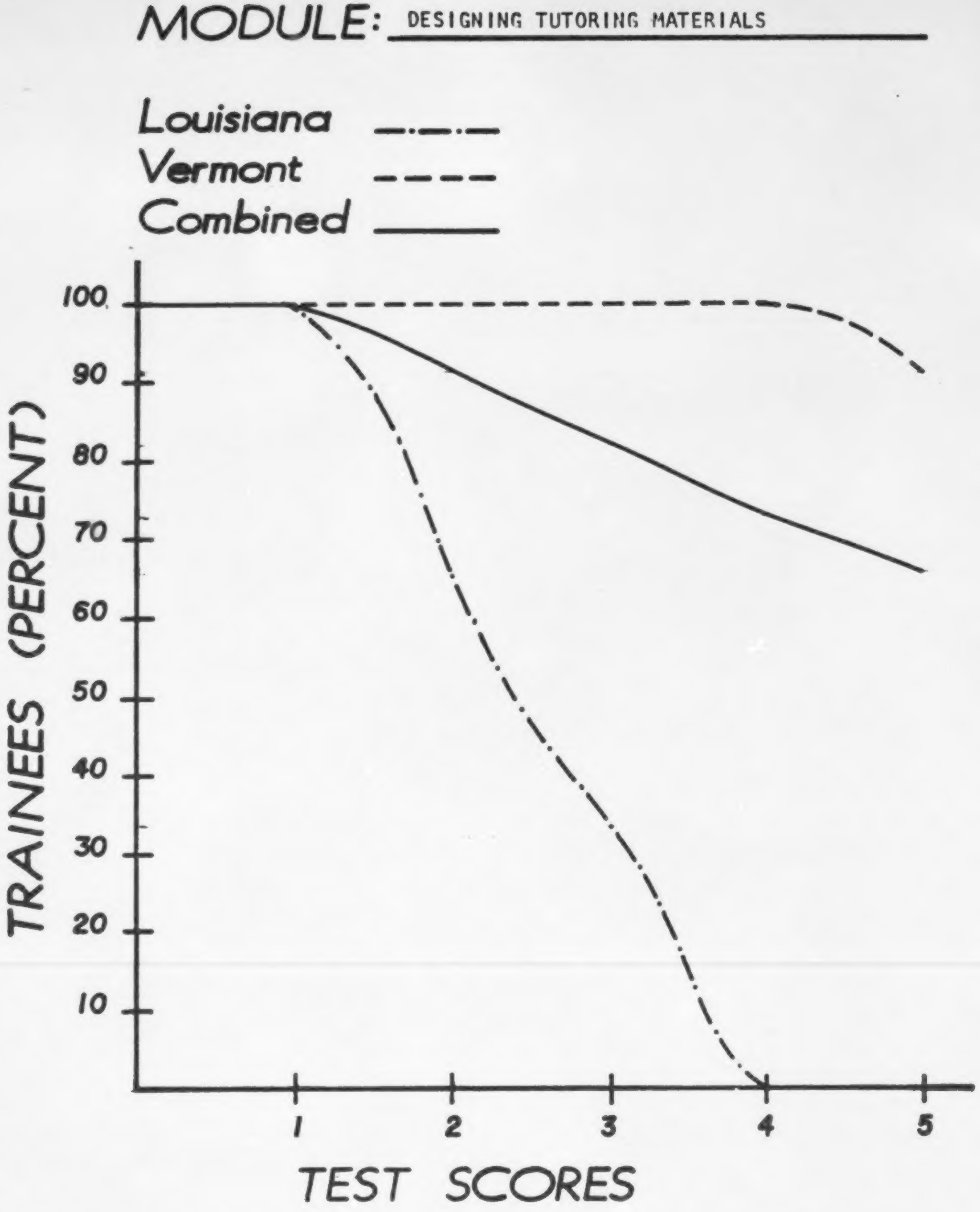


Figure 5.10 Comparative Percentage Chart

FIELD SITE: Combined

MODULE: Concept Analysis

PRE-TEST MEDIAN: – – – – – **POST-TEST MEDIAN:** ———

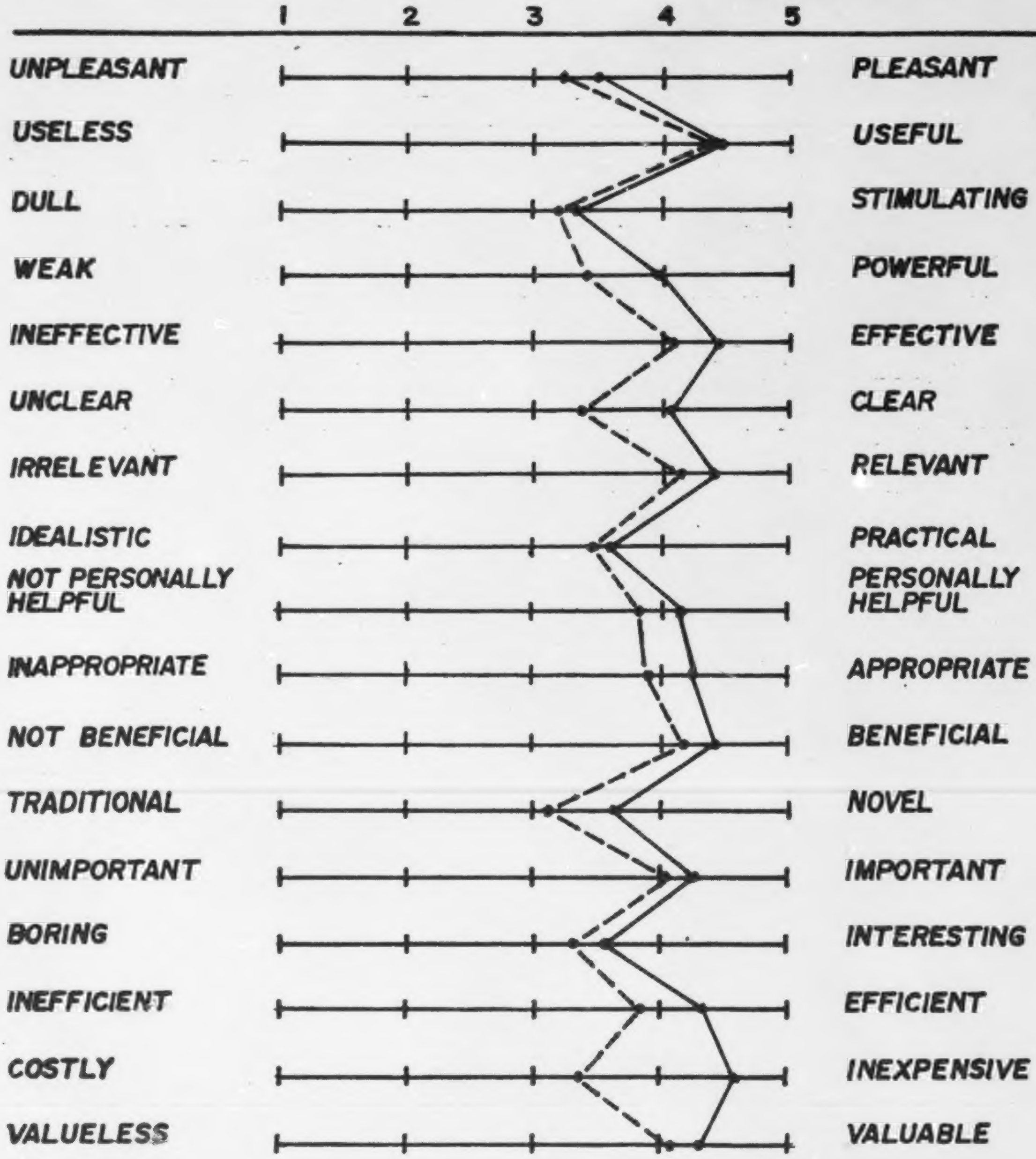


Fig. 5.11. Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Task Analysis

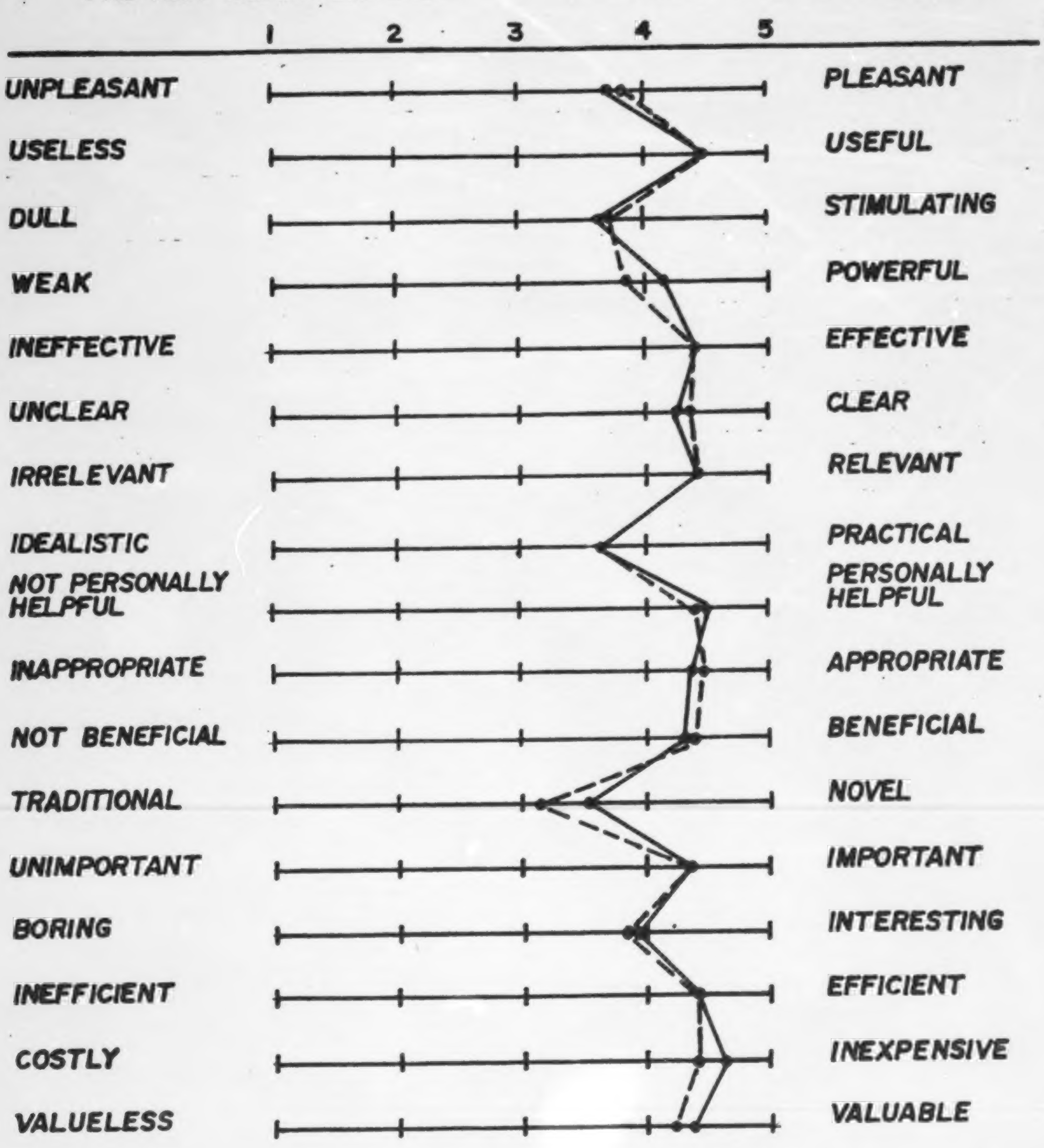


Fig. 5.12. Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Lesson Planning Using Task Analysis

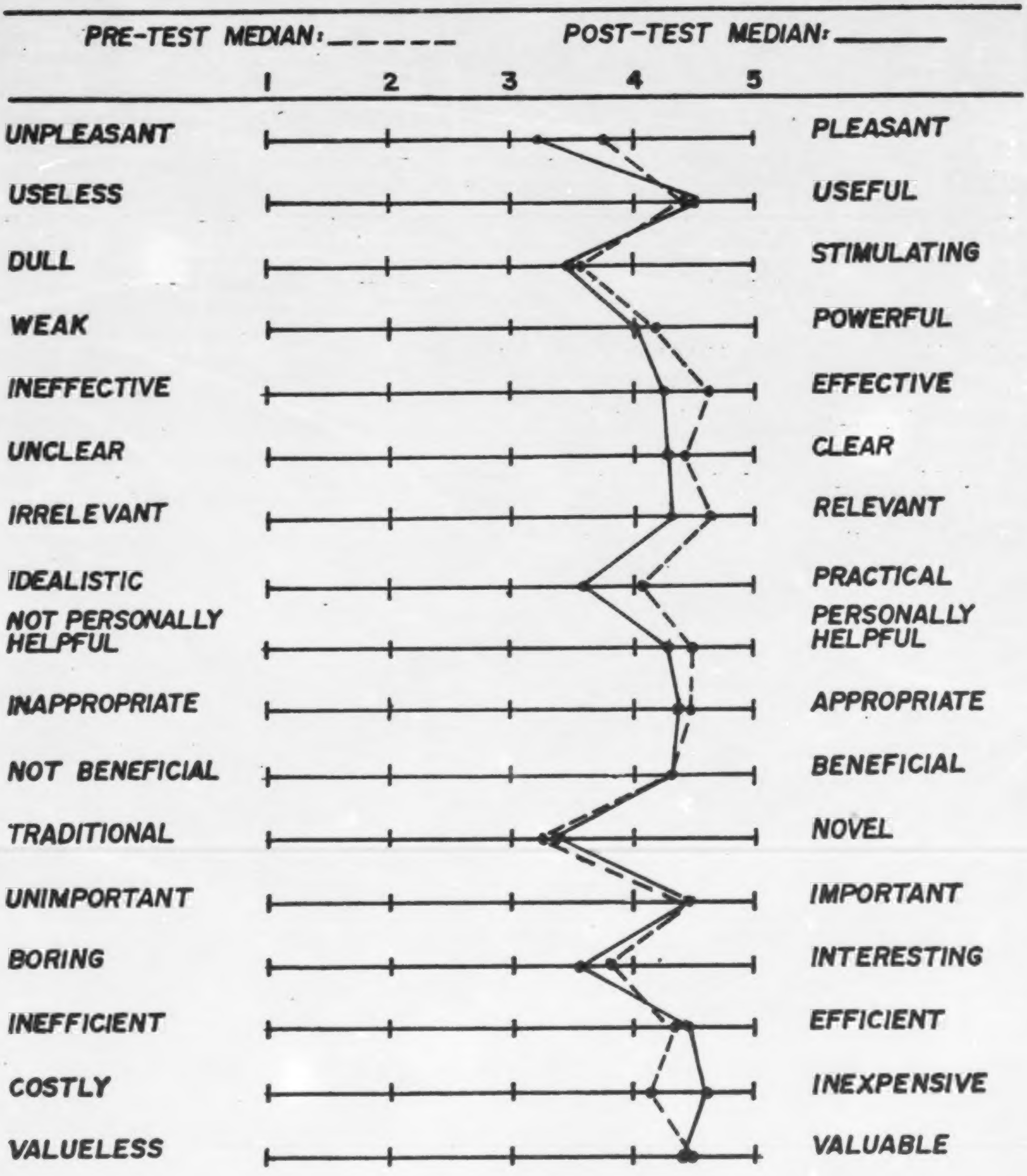


Fig. 5.13. Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Lesson Planning Using Concent Analysis

PRE-TEST MEDIAN: _ _ _ _ _ **POST-TEST MEDIAN:** _______

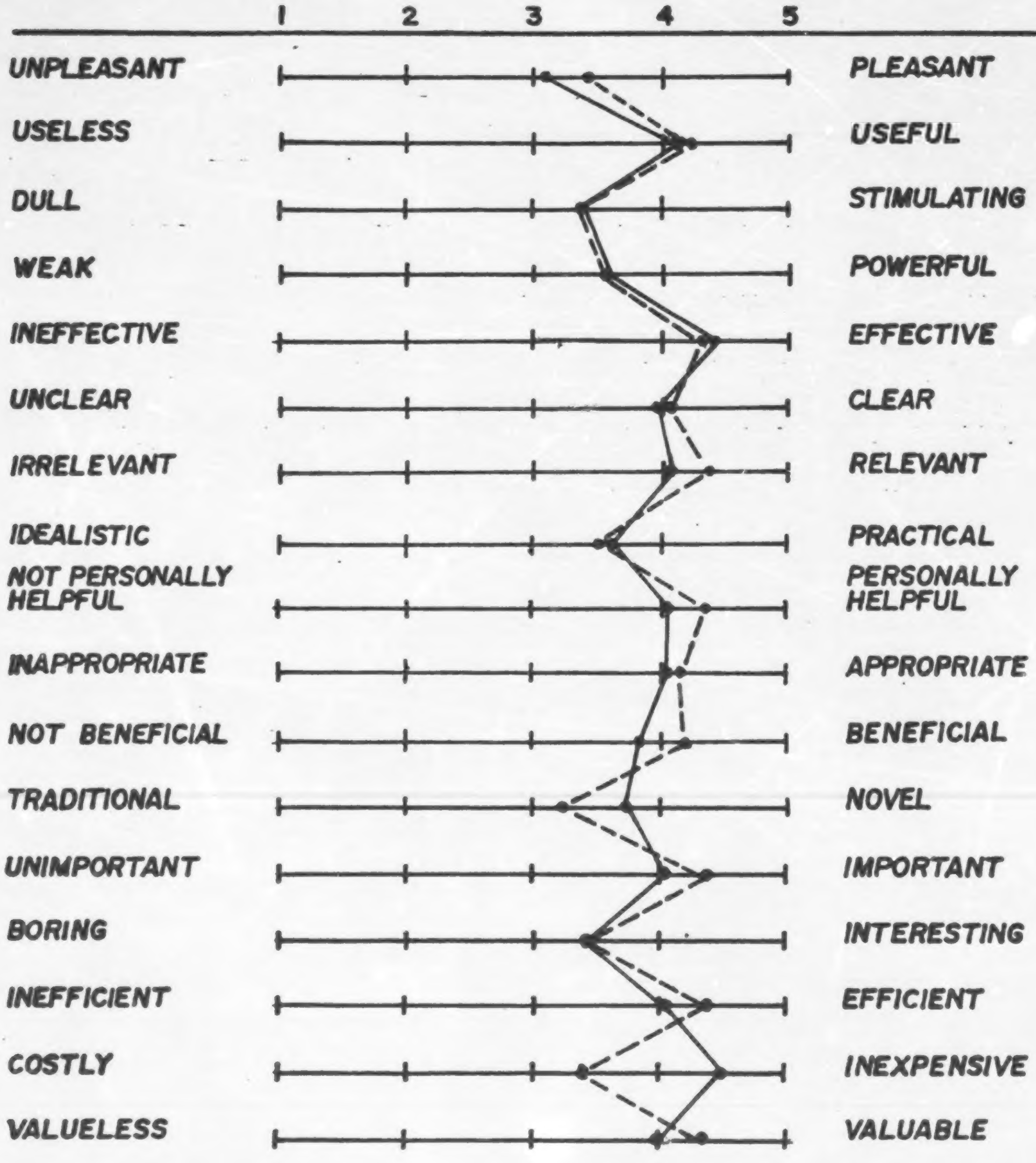


Fig. 5.14. Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Instructional Games

PRE-TEST MEDIAN: _____ **POST-TEST MEDIAN:** _____

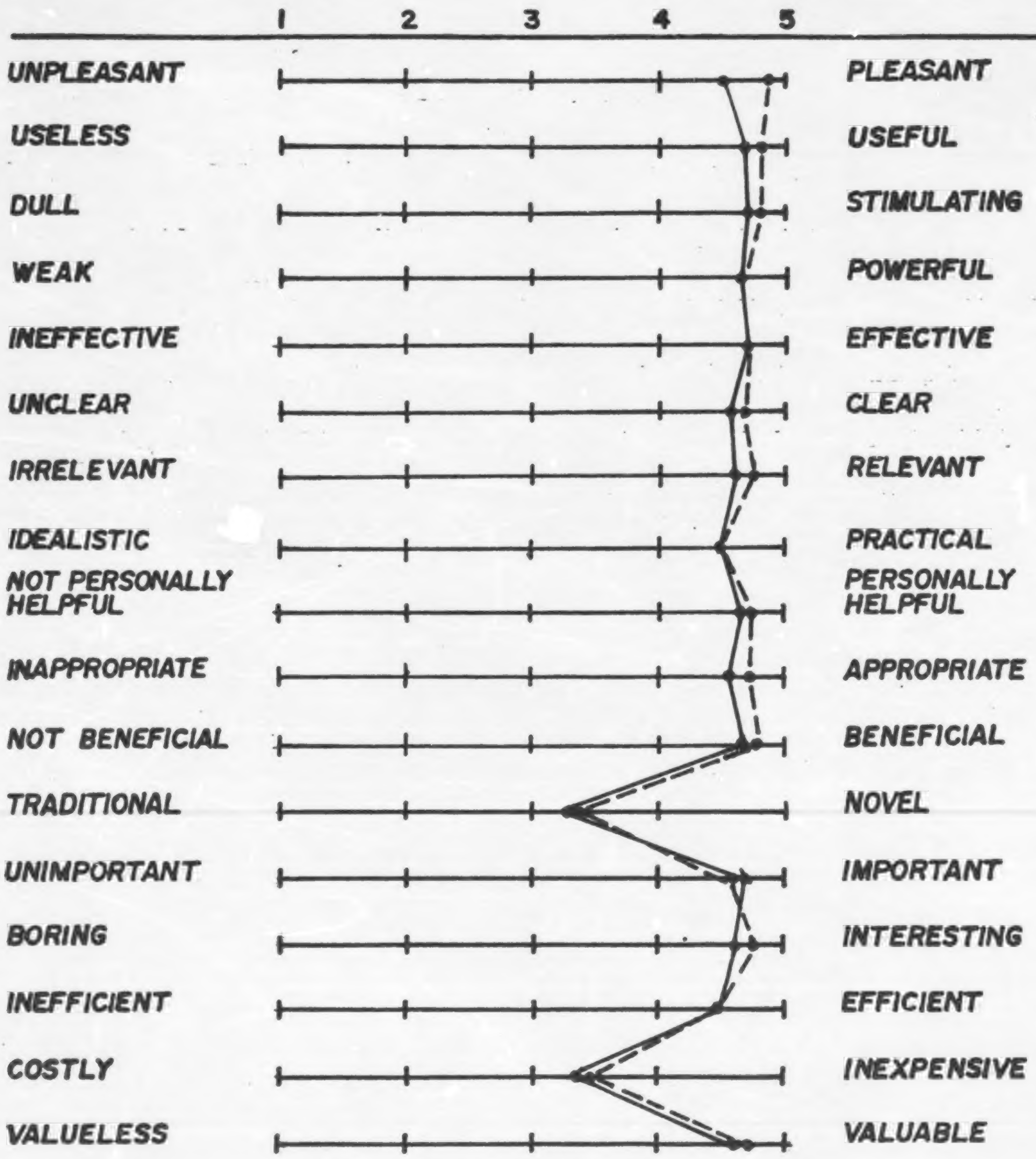


Fig. 5.15. Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Teacher-Made Reading Materials

PRE-TEST MEDIAN: _____ **POST-TEST MEDIAN:** _____

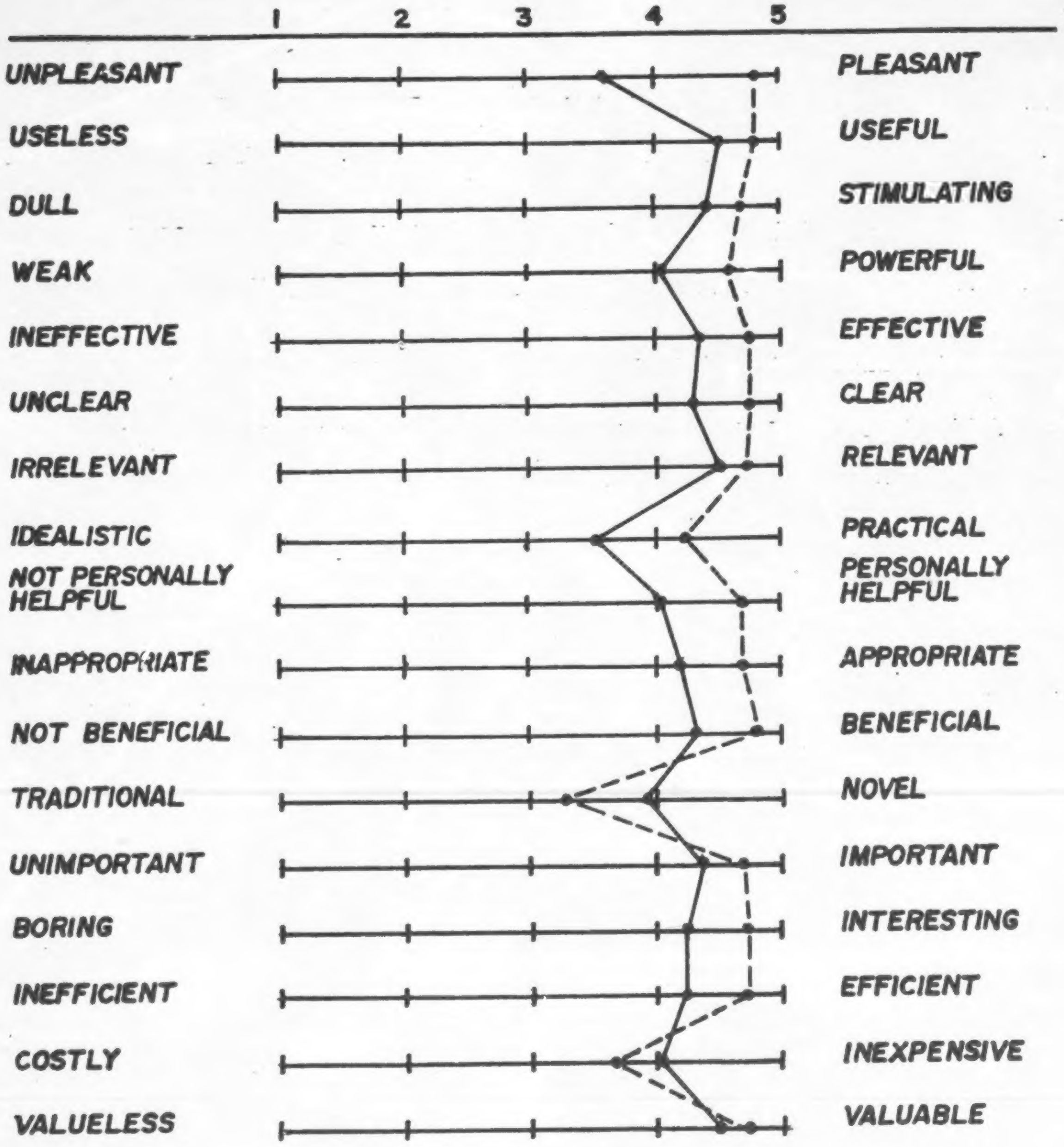


Fig. 5.16 Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Classroom Charts

PRE-TEST MEDIAN: _____ **POST-TEST MEDIAN:** _____

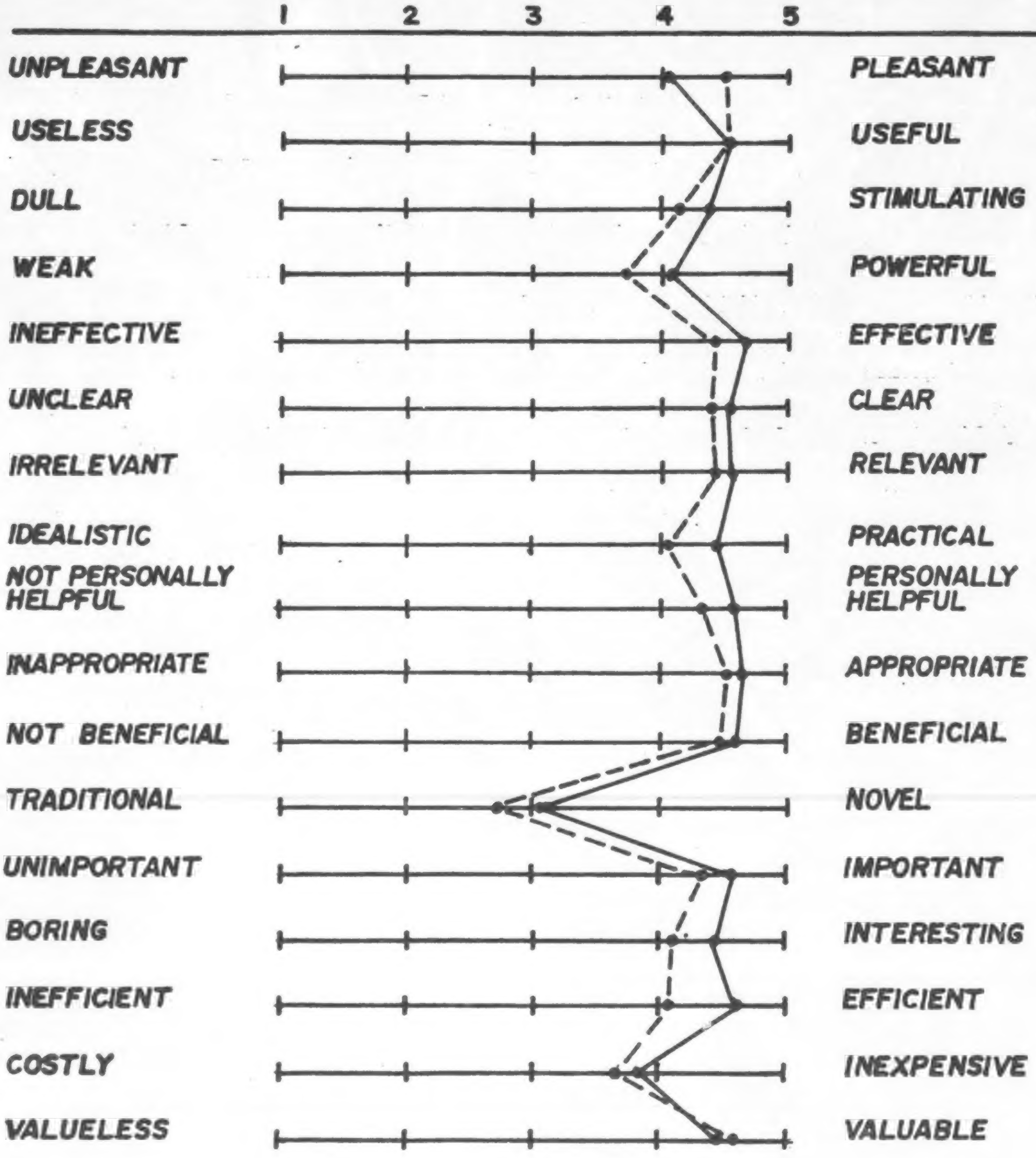


Fig. 5.17 Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Classroom Graphics

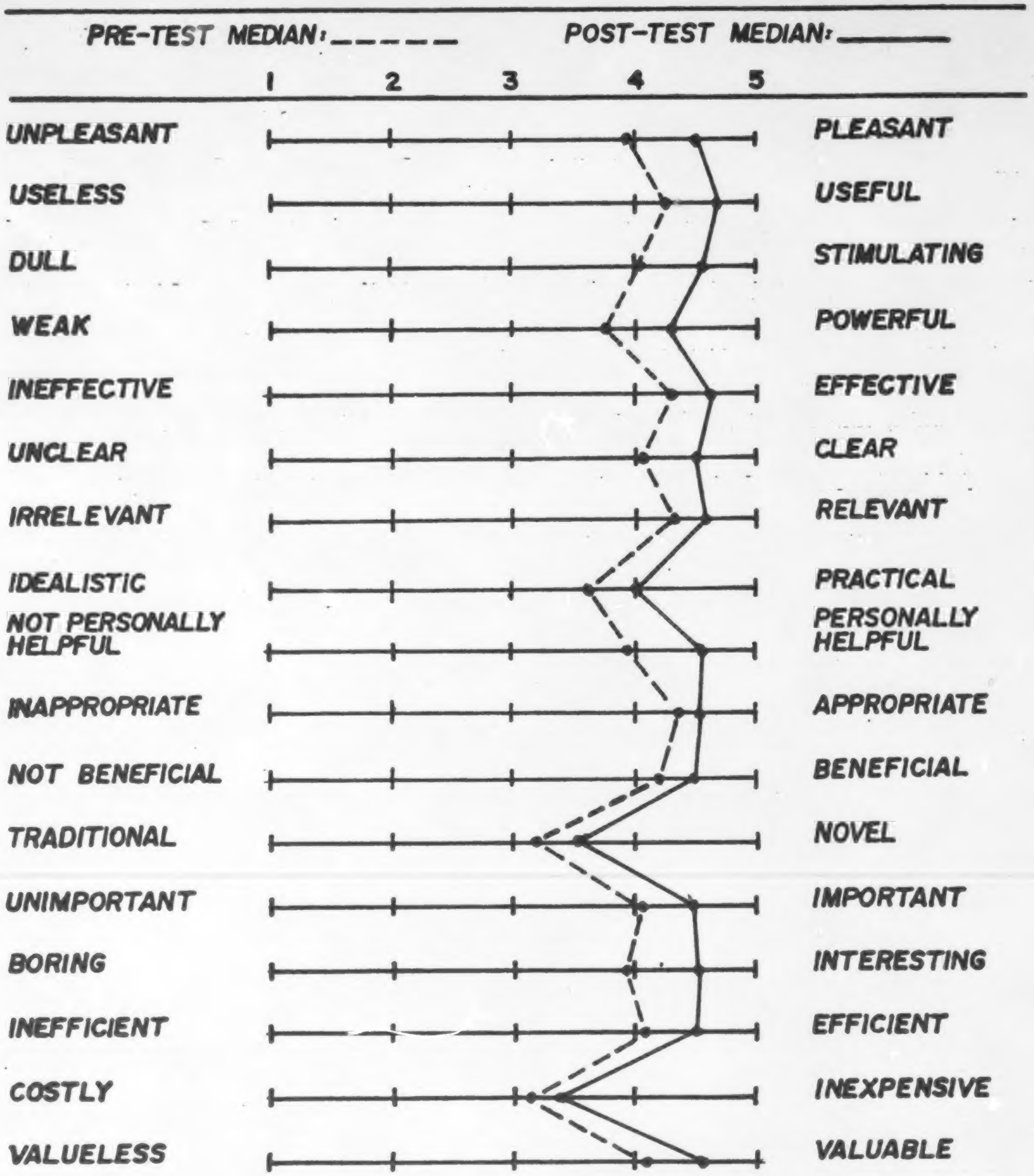


Fig. 5.18. Attitude Measurement Chart

FIELD SITE: Combined

MODULE: Tutoring Materials

PRE-TEST MEDIAN: _ _ _ _ _ **POST-TEST MEDIAN:** ______

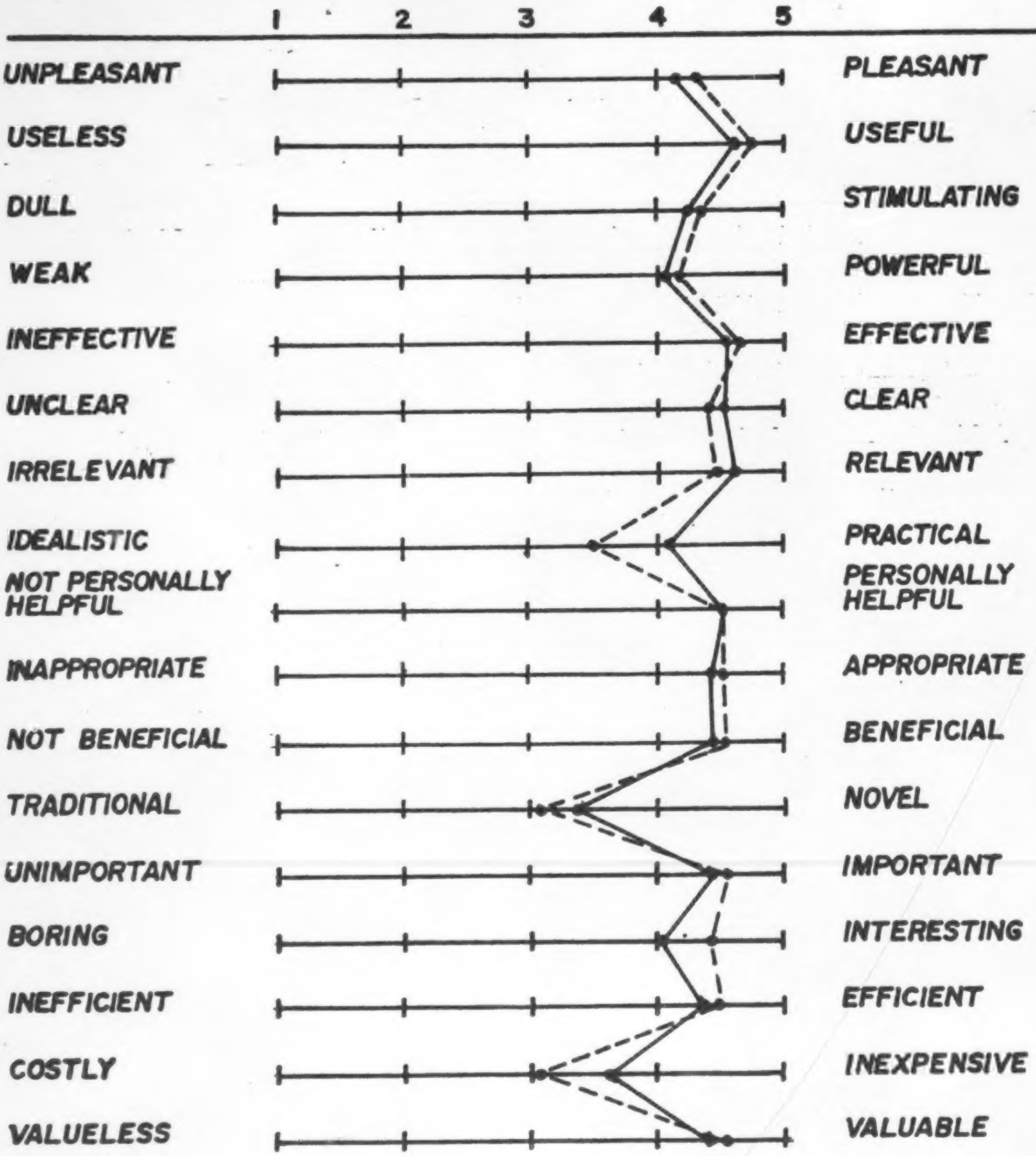


Fig. 5.19. Attitude Measurement Chart

2. Using the adjective pairs "pleasant-unpleasant," "dull-stimulating" and "boring-interesting" as indicative of the affective tone of the various preinstructional competencies, it appears that the modules dealing with the design of a concrete product (e.g., tutoring materials, games, and charts) were received more positively than those dealing with the underlying competencies presented in isolation (e.g., concept analysis, task analysis, and lesson planning).

3. Using the adjective pairs "useful-useless," "weak-powerful," "ineffective-effective," "irrelevant-relevant," "not personally helpful-personally helpful," "inappropriate-appropriate," "not beneficial-beneficial," "important-unimportant," "inefficient-efficient," and "valueless-valuable" as indicative of the teacher trainees' perceptions of the utility of a specific preinstructional competency, a similar pattern is suggested. The skills related to the design of a specific instructional material were perceived to be more useful than the generalized analytic skills.

4. The "novel-tradition" dimension consistently received the least positive ratings, if novelty is considered desirable. Most ratings were midway between the poles suggesting that the trainees did not consider the competencies to be very different from the conventional ones with which they were familiar. In almost all cases, however, the trainees rated a competency more novel after they had worked through the module.

5. Ratings on the "expensive-inexpensive" dimension showed considerable divergence from ratings on most other dimensions. The trainees changed their minds considerably as a result of working through the individual modules. However, there was no consistent pattern in these shifts: trainees shifted toward either pole with equal frequency.

Changes in Attitudes Toward the Self-Instructional Format. As a part of their pre- and posttest semantic differential scales, the trainees received an additional scale dealing with the general concept of self-instructional materials. This scale was designed to measure changes in the trainees' attitudes toward the format of the instructional materials independent of the content of the individual modules. Figure 5.20 graphically depicts the trainees' ratings on this semantic differential scale before and after working through all modules.

In general, the trainees' attitudes toward the self-instructional format shifted in the positive direction. The most notable shift was in the dimension of "traditional-novel." The trainees considered the self-instructional format much more novel than they had before using it. On the basis of trainee and instructor comments, this shift reflects the salience of the portable teaching machine and the mediated components. The same perception is the basis for a noticeable shift toward the "costly" pole in another item. There was a slight negative shift toward irrelevance, but the difference was very small. There was a marked negative shift toward "unclear" suggesting that the trainees missed the ability of the live instructor who would have immediately clarified their problems in a conventional course.

FIELD SITE: Combined

MODULE: Self-Instructional Materials

PRE-TEST MEDIAN: - - - - -   **POST-TEST MEDIAN:** ———

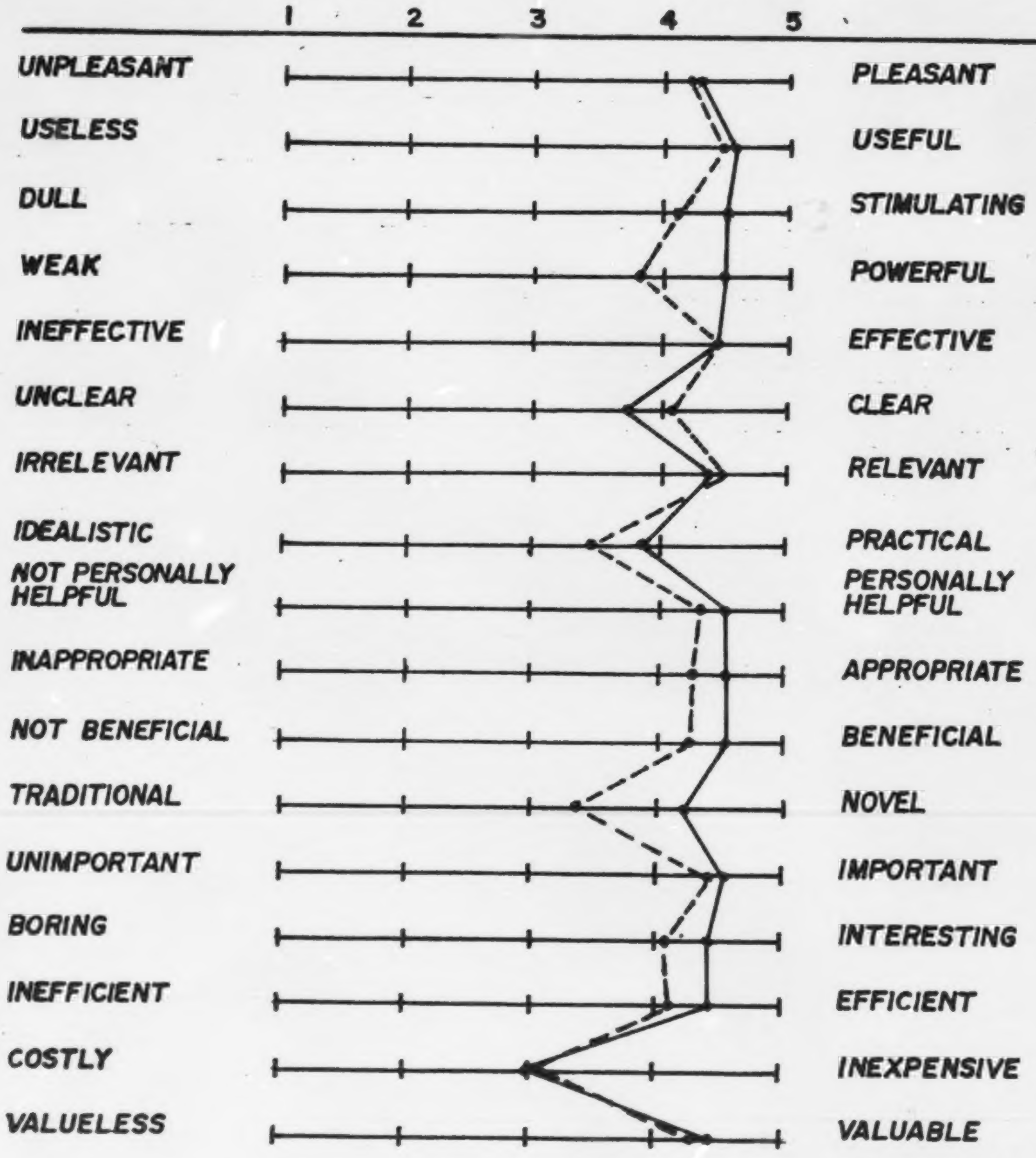


Fig. 5.20. Attitude Measurement Chart

SUMMARY

The total package testing of the preinstructional competencies program involved testing the trainees' attainment of the specific behavioral objectives, their changes in attitude toward the use of each competency and toward the self-instructional mode of learning. Trainees' performances on individual applied tests were evaluated by the instructors at the two field sites. When instructor ratings were compared, a major discrepancy was found between the performance of the trainees in these field sites. Trainees in Rutland, Vermont, performed at the 4-5 level (good to exceptional) while trainees in Thibodaux, Louisiana, performed at the 2-3 level (adequate to acceptable). Explanations for this discrepancy include the unreliability of the scoring system as well as differences between the two instructors and the two groups of trainees. There is a strong indication that the materials are not as self-contained as the earlier formative evaluations seemed to suggest. Results from the attitude measurement were more consistent between the two sites and they appeared to be generally positive. Modules dealing with the design of a concrete product were generally perceived to be more interesting and useful than those dealing with the underlying theory. Trainees' attitude toward self-instruction showed a general positive shift. However, the modules were considered to be less clear than anticipated.

REFERENCES

Braffet, Richard T. Development and evaluation of a module to train special education teacher trainees to produce classroom visual materials. Bloomington, Indiana: CITH, Final Report 9.34, 1976.

Ellson, D.G. The effect of programed tutoring in reading on assignment to special education classes: A follow-up study of four years of tutoring in the first grade. Bloomington, Indiana: CITH, Final Report 8.3, 1974.

Fleming, M. Perceptual principles for the design of instructional materials. Viewpoints: Bulletin of the School of Education, Bloomington, Indiana: Indiana University, 46 (4), 1970.

Goodstein, H. The social learning curriculum. Columbus, Ohio: Charles E. Merrill Publishing Co., 1974.

Gordon, G.N. Classroom television: New frontiers in ITV. New York: Hastings House, 1970.

Mager, R.F. Measuring instructional intent. Belmont, CA.: Fearon, 1973.

Pfau, G.S. Project LIFE: programming rationale and process. Improving Human Performance: A Research Quarterly, 1972, 1, 3, 8-17.

Rosen, T. Instructional materials: How to analyze, adapt, select, and develop. Logan, Utah: Utah State University, 1975.

Stolovitch, H. Approaches to the selection of media: Theory and practice. Bloomington, In.: CITH, Indiana University, 1975.

Thiagarajan, S., Semmel, D., & Semmel, M.I. Instructional development for training teachers of exceptional children: A sourcebook. Minneapolis: Leadership Training Institue/Special Education, University of Minnesota, 1974.

Zeaman, D., & House, B. The role of attention in retardate discrimination learning. In N.R. Ellis (Ed.), Handbook of Mental Deficiency: Psychological Theory and Research. New York: McGraw-Hill, 1963.